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ABSTRACT

This manual reviews the use of work samples in the vocational assessment of blind and visually impaired persons and suggests improvements in their use. The information in the manual was gathered through a literature review, a national survey of vocational evaluators in rehabilitation facilities and schools for the blind, and ideas developed by the principal author while teaching vocational evaluation courses. The first chapter contains a summary of literature describing some of the fields in which persons with visual impairments are employed and a discussion of the implications for work sample use. The second chapter presents an overview of job and training analysis methodologies as they relate to visually impaired persons, while the ways work samples may be employed in a vocational assessment process are reviewed in Chapter 3. In Chapter 4, major approaches to vocational assessment and the use of work samples with visually impaired persons are described; the following chapter lists techniques for selecting and administering work samples. Chapter 6 defines work samples, describes different types, and offers guidelines for their use. Chapter 7 contains information concerning locally developed work samples used in the vocational evaluation of visually impaired persons, while the following chapter provides similar information concerning commercial work sample systems. The final chapter summarizes the state-of-the-art in the use of work samples in the vocational evaluation of visually impaired persons and presents recommendations for the future development and use of work samples. (KC)

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WORK SAMPLES AND VISUALLY IMPAIRED PERSONS:

A STATE-OF-THE-ART REVIEW AND RESOURCE MANUAL

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CONTENTS

CHAPTER PAGE

Introduction .... i-viii

1 Training and Employment of People with Visual Impairments: Implications for Vocational Evaluation 1

Occupational Information Resources 3
Job and Training Modifications 4
Expanding Job and Career Opportunities 9
Implications for Vocational Evaluation and the Utilization of Work Samples 12

2 Determining the Requirements of Jobs and Training Programs Programs 15

Job Analysis 16
Job Development Laboratory 22
Physical Demands Job Analysis 28
Training Analysis 33
Conclusion 36

3 The Process of Vocational Evaluation and the Role of Work Samples 41

Introduction 41
Referral 43
Client Preparation 45
Orientation/Intake 47
Intake Interview 48
Implementation of Vocational Evaluation 50
Feedback and Staffing 52
Reports and Communication 52

4 Approaches to the Vocational Assessment of Visually Impaired Persons 55

Trait Approach to Vocational Assessment 55
Aptitude Tests 58
Worker Trait-job Matching Systems 59
Problems with Trait Approach 62
Traits and Visually Impaired Persons 64
Task Approach to Vocational Assessment 69
Present Performance Approach 71
Learning Assessment Approaches 74
Conclusion 79

5 Test Administration and the Visually Impaired Population.. 81

Orientation and Preparation for Assessment................ 84
Administration Procedures.................................. 87
Presentation of Instructions and Test Items............... 88
Recording of Responses to Test Items...................... 91
Procedures to Help Assure Valid Assessment................ 93

6 Work Samples and the Visually Impaired Client: An Introduction.. 97

What are Work Samples?.................................... 97
Work Samples and Visually Impaired Persons................ 99
Types of Work Samples...................................... 100
Related Assessment Techniques.............................. 102
Guidelines for Selection................................... 103
Relevance of Work Samples.................................. 104
Needs and Characteristics.................................. 107
Vocational Exploration..................................... 108

7 Developing and Modifying Local Work Samples for Use with Clients with Visual Impairments.......................... 111

Procedures... 111
Work Sample Manual Development............................. 121

8 Work Samples Developed by Local Rehabilitation Facilities. 123

National Industries for the Blind (NIB).................. 123
Clawson Work Samples....................................... 127
Electromechanical Work Samples............................ 127

9 Commercial Work Sample Systems and the Visually Impaired Client.. 147

VALPAR Components Work Sample............................... 147
McCarron - Dial Work Evaluation System.................... 151
Non-Commercial Adaptations of Work Sample Systems......... 151

10 Needs and Recommendations................................ 201

Reference List... 207

Appendix: Additional Source Material. 215

LIST OF FIGURES

PAGE

1. Rosen's Theory of Work Adjustment 17

2. Job Analysis Schedule 20-21

3. Functional Evaluation of Physically Disabled 23-26

4. Job Analysis Form 27

5. Summary Form 29-30

6. Physical Demands Job Analysis & Visual Demands Checklist ... 32

7. Training Analysis Information Form 34

8. Vocational Education Special Education Project Career Clusters And Subclusters 37

9. Student Prevocational Enabling Skills Checklist 38

10. Vocational Evaluation Process Model 44

11. IVAP Sample Schedule 49

12. Individual Vocational Evaluation Plan 51

13. Example from The Classification Of Jobs According To Worker Trait Factors 61

14. Traits for Work Potential Evaluation 65-67

15. Relationship of Attitudes to Tasks 70

16. Measurement of Client Response to Interaction of Content, Task Difficulty, and Teaching Technique 78

17. Field-by-Levels Organization of Occupational Information ... 109

18. Suggested Form for Listing of Tasks in Work Samples 115

19. Suggested Form for Recording Administrative Procedures in the Work Sample to Measure Learning Ability and Learning Style 118

20. Documentation of Evaluation Tasks 125-126

21. Modified Work Samples Categorized by Work-Field-Level 205

INTRODUCTION

Vocational evaluation is a service that uses work, real or simulated, as the focal point of vocational assessment and exploration. It is a service designed to assist individuals develop appropriate plans for their vocational future. In vocational evaluation, an individual may participate in a sequence of psychological and vocational testing, physical assessments, work samples, situational assessments, occupational exploration and job tryouts. Vocational evaluation is an important service for visually disabled persons, and its use has increased in recent years. Effective delivery of vocational evaluation services may help facilitate the optimal career development of visually impaired persons by helping them learn how their abilities and interests relate to jobs and careers. For instance, during vocational evaluation, a congenitally blind youth may consider a number of occupations in which he is interested; similarly, an adventitiously blinded person may be assessed for new occupations if he or she is unable to return to his or her previous job.

Despite the importance of vocational evaluation of blind and visually impaired persons, rather little information has been published concerning the topic. Mary Bauman (1951, 1973, 1968) has written extensively concerning psychological testing of blind people, and Vander Kolk (1982) has updated these efforts. Some insight is given by an experimental approach developed by the National Industries for the Blind

(Richterman, 1982). Additionally, Dicksen (1976) has published a monograph concerning the use of work samples with this population, and Bauman (1975) edited a monograph based on a conference held in New Orleans on this topic. However, there remains a continued need for improving the vocational evaluation of blind and visually impaired persons.

The need for continued development and improvement of vocational evaluation of blind and visually impaired persons is being recognized as several agencies in the field are making efforts to address this issue. The Research and Training Center in Blindness and Low Vision at Mississippi State University is implementing two projects related to vocational evaluation: (1) a cooperative project with National Industries for the Blind concerning a series of "electromechanical work samples"; and (2) a project to develop and modify work samples to be used with the blind in assessment related to skilled, technical and professional positions. Additionally, the American Foundation for the Blind has recently sponsored two meetings concerning the formation of a task force that will address the issue.

Several concurrent trends are occurring that are bringing to light needed continued development of vocational evaluation services for the blind and partially sighted. First, the structure of the economy is changing so that information processing and service occupations are growing rapidly. Increasingly, production assembly jobs are being replaced with robotics and automation, and all levels of the economy are requiring high levels of training and technical expertise. Fortunately, computer technology is making occupations at higher levels more easily available to visually impaired persons. Secondly, a greater emphasis is being placed on mainstreaming disabled persons into society. Sheltered industry is increasingly seen as a less acceptable option for highly functioning blind persons. Additionally, more emphasis is being placed on training individuals and placing them in skilled, technical, and professional occupations. The impact on the vocational evaluation of blind persons is clear. Good vocational evaluation must increasingly have the capacity to validly assess an individual for a wide range of occupations from skilled to professional in a wide variety of fields. A final trend involves increased numbers of multi-handicapped blind persons who are applying for rehabilitation services and working in sheltered industries for the blind (Richterman, 1982). These include blind-mentally retarded, deaf-blind, and other multi-handicapped individuals. Adapted techniques for evaluating vocational potential, present skills, and effective training techniques for these individuals is important.

What, specifically, are work samples? Work samples are replications of vocational skills and/or aptitude tests which use the tasks: tools and materials of the workplace in vocational assessment. Work samples have been used for many years in vocational evaluation programs for the visually disabled, as well as with other persons with special needs. They are but one part of a comprehensive vocational evaluation process; nevertheless, use of work samples has been viewed as an effective method of gaining important vocational information about individuals, particularly those with special needs. Skillfully and professionally applied, work samples can:

- provide occupational exploration experiences while simultaneously assessing interests and abilities;

- assess learning abilities, rates and styles;
- estimate the usefulness of assistive devices and other job modifications; and
- provide a more valid assessment of job skill levels than traditional psychometric instruments.

If work samples are used as counseling tools, they also provide visually impaired persons with vital feedback which will aid them in their decisions about careers and employment.

This manual is designed to add to the literature of vocational evaluation of blind and visually impaired people by reviewing what has been done to date and what needs to be done in the future. Specifically, the manual is designed to:

- provide a review and analysis of the present state-of-the-art in using work samples in the vocational assessment of visually impaired persons,
- draw together ideas, concepts, and resources that have implications for the development and use of work samples with visually impaired persons, and
- develop recommendations for the improvement of the use of work samples with visually impaired persons.

The information presented in this manual was gathered through a variety of sources: a literature review of the use of work samples in the vocational evaluation of blind persons, a national survey of vocational evaluators in rehabilitation facilities and schools for the blind, and ideas developed by the principal author while teaching vocational evaluation courses.

The underlying thesis on which this manual is based includes the following statements:

- Rehabilitation professionals have a responsibility to facilitate the optimum career development and upward mobility of visually impaired persons.
- Blind and visually impaired persons have capacities for a wide range of jobs.
- Occupational stereotyping of blind and visually impaired persons must be resisted.
- Vocational evaluation can be a powerful tool in helping the visually impaired facilitate their own career development.
- Blind and visually impaired persons can be limited by the nature of assessment instruments and the manner in which they are used.
- Work needs to be done to help insure that the tools of the vocational evaluation process and the manner in which they are used promote the career development of persons with visual disabilities.

It is hoped that this manual will be useful in improving the use of work samples and the overall vocational evaluation of blind and visually impaired persons.

The manual is organized around chapters which focus on issues that should be helpful to those who assist persons with visual impairments learn about themselves and the world of work.

Chapter 1: Training and Employment of People with Visual Impairments: Implications for Vocational Evaluation

In this chapter, a summary of literature and other resources describing some of the fields in which persons with visual impairments are employed is presented and implications for work sample use are discussed.

Chapter 2: Determining the Requirements of Jobs and Training Programs

This chapter presents an overview of job and training analysis methodologies particularly as they relate to the employment of visually impaired persons.

Chapter 3: The Process of Vocational Evaluation and the Role of Work Samples

The ways work samples may be employed in a comprehensive vocational assessment process are reviewed in this chapter.

Chapter 4: Approaches to the Vocational Assessment of the Visually Impaired Population

Major approaches to vocational assessment and the use of work samples with visually impaired persons are described and discussed.

Chapter 5: Test Administration and the Visually Impaired Population

Techniques for selecting and administering tests, including work samples, to visually impaired individuals are described.

Chapter 6: Work Samples and the Visually Impaired Client: An Introduction: Developing and Modifying Local Work Samples

In this chapter, work samples are defined and different types of work samples are described. Guidelines for the selection and use of work samples with visually impaired individuals are also detailed. Step-by-step procedures for the development of work samples are discussed.

Chapter 7: [illegible] Samples Developed by Local Rehabilitation Facilities

This chapter reports the results of a survey identifying information concerning locally developed work samples used in the vocational evaluation of visually impaired persons.

Chapter 8: Commercial Work Sample Systems and Visually Impaired Persons

Commercial work sample systems and their applicability for use with visually impaired persons are reviewed. Adaptations of these commercial systems for use with visually impaired persons are discussed.

Chapter 9: Needs and Recommendations

This chapter summarizes the current state-of-the-art in the utilization of work samples in the vocational evaluation of persons with visual impairments. It points out needs in the field and presents recommendations for the future development and use of work samples in assisting visually impaired people to plan for, obtain training related to, and enter the world of work.

1

TRAINING AND EMPLOYMENT OF PEOPLE WITH VISUAL IMPAIRMENTS: IMPLICATIONS FOR VOCATIONAL EVALUATION

Vocational evaluation is a comprehensive process of assessing the vocational strengths and needs of individuals through techniques that use work, real or simulated, as the focal point of assessment (VEWAA, 1975). Vocational evaluation should provide recommendations that facilitate the career development of blind and visually impaired persons through recommendations for job training, work adjustment training, job placement, and other rehabilitation and educational services. Work samples constitute one type of assessment tool in the vocational evaluation process that utilizes the tools, materials and tasks of actual jobs and can simultaneously be used as a vocational assessment and exploration tool (VEWAA, 1975).

Work samples are an important tool in the vocational evaluation process because they give clients the opportunity to try out parts of new jobs and experience new vocational behaviors in a relatively short time in a supportive environment. Work samples need to be available to give visually impaired clients the opportunity to sample a wide range of occupational categories at various skill levels.

For work samples to be selected and used effectively with the visually impaired, it is critical that good information be available concerning: (1) jobs blind persons can do and potential on-the-job and training adaptions; (2) characteristics required of blind and visually impaired individuals on those jobs and in training; and (3) work samples and other assessment techniques and materials that can validly assess for these characteristics of blind and visually disabled persons. This chapter addresses number 1 - jobs performed by blind workers and training and on-the-job adaptations for job performance. Subsequent chapters address numbers 2 and 3.

More specific answers to the following questions are needed:

- What jobs are blind and visually impaired persons capable of doing?
- What characteristics are important for various types of occupations? Are different characteristics required that are associated with the individual's visual impairment and at what level? (For example, the ability to read braille and mobility skills.)
- How does the worker with a visual impairment perform the tasks of the job? Are job modifications and technological aids used? If so, what are they?
- What training is needed for various occupations? What modifications and support services in the training process itself are necessary?

Presently, some information has become available that responds to these questions. However, the field lacks the degree of specificity necessary to answer each question completely.

Occupational Information Resources

A number of sources provide information concerning what jobs blind and visually impaired persons can do and how they do them. The Greater Detroit Society for the Blind (1978) has established an *Occupational Information Library for the Blind* which describes jobs, duties, training, and modifications needed for both the blind and partially sighted. Bauman and Yoder (1960, 1962) published the most complete descriptions of various jobs held by visually impaired persons. Despite the age of these materials, they remain useful. Other more recent studies have documented fields in which the visually impaired are employed (Aster, 1979; Clayton, 1973: Dickey and Vieceli, 1972; Rossi and Marotta, 1974). Much of this literature has been summarized in an annotated bibliography published by the Research and Training Center in Blindness and Low Vision (Bagley, Cook, Graves, Hagedorn, & Moore, 1983). Currently the American Foundation for the Blind is implementing a project to gather information concerning the employment of blind persons, and the Detroit Society for the Blind is updating its *Occupational Information Library.* Another useful source for identifying potential jobs for visually impaired persons is the *Classification of Jobs Manual* (Field and Field, 1981). This manual provides job analysis information compiled by the Department of Labor for the 1977 edition of the *Dictionary of Occupational Titles* and provides coded traits required of workers in various occupations, including whether sight is considered necessary. While certain jobs which are actually being performed by blind persons were considered as requiring sight, the manual is, nevertheless, a good source of potential jobs in the economy.

The charts at the end of this chapter provide a summary of occupations mentioned in this literature that have been performed by visually impaired persons. These charts are certainly not exhaustive; still they clearly establish that visually impaired persons have been employed in a wide range of occupations. This information is presently available; however, it is often not specific enough, not considered relevant to a local area, and/or not disseminated in useable form. The result is that rehabilitation professionals may form limited pictures of the occupational capabilities of visually impaired clients. More useable and systematiclly organized information is needed for use by rehabilitation professionals.

Job and Training Modifications

Information about specific adaptation techniques and job modifications is even less available than basic employment information for rehabilitation professionals. Several catalogues have been published that describe technical adaptations and specialized equipment (American Foundation for the Blind, 1980; Gugerty 1982; Smith-Kettlewell, 1983), and some articles describe the use of aids to solve functional problems (Scadden, 1982; Weisgerber, 1982). Some literature has also been written describing adaptations in providing vocational and professional for visually impaired persons (Dahl and Lipe, 1978; Weisgerber, 1982). Additionally, technical advances that have the potential for opening up many technical and professional jobs to visually impaired persons are occurring continuously, but information that relates job adaptation techniques to specific occupations and training situations is not presently available in an easily obtainable form.

Gathering accurate information concerning jobs--whether unskilled, skilled, technical, or professional--in which blind and visually impaired persons can be employed is a complicated process. It requires a good record keeping system that takes into account several related variables. Even when accurate information is collected, determining the implications for other visually impaired persons and for the use of work samples during vocational evaluation is neither simple nor easy.

The first problem deals with an important philosophical issue that has provoked strong differences of opinion within the field of blindness: to what degree does one consider blind and visually impaired persons as belonging to a separate category of individuals who need specialized services and about whom we need specialized information? The two extreme responses to this question result in problems in the gathering and using of good occupational information. On the one hand, the perception may be that the majority of blind persons are rather limited in their realistic occupational possibilities and that the gathering of information concerning the employment of blind persons would be, at best, not useful and, at worst, a waste of time. Consequently, information is more readily available concerning jobs in which blind persons have stereotypically been employed. On the other hand, some may feel that blind persons may not need substantial special services and that the keeping of detailed records may do more to reinforce the perception of differences and dependency by the blind than to enhance their employment prospects. The unfortunate result is two strong forces that may contribute to the lack of availability of good occupational information.

Consideration of why such specific information is needed is important. There is, in fact, a danger of using such information to stereotype blind persons. A list of what jobs "blind persons can do" can certainly be restrictive and inhibit creativity. The fact is that most sighted people's reliance on sight in day-to-day activities makes it extremely difficult for them to imagine how particular jobs would be done without sight. It is this fact that makes a "job list" potentially restrictive. However, it is this same fact that makes such a resource needed. If used correctly, occupational information resources can help professionals think more broadly and creatively about job prospects for blind persons. Additionally, systematic descriptions of job adaptations and modified ways of performing job tasks can help create a specific picture of how a blind or visually impaired person could perform various jobs. Such information could aid in raising expectations and expanding potential opportunities in the minds of vocational evaluators and counselors; it could provide information to share with employers or vocational teachers; and it could suggest vocational evaluation procedures to tap abilities and interests related to a broader range of occupations.

Beyond the decision to gather information about the employment of blind persons, the way in which information is gathered and categorized is important. First, information must be gathered about the actual employment and training of blind and visually impaired persons including: (1) occupations at which blind persons can or may be engaged; (2) job adaptations and modifications; (3) characteristics of the successful blind and visually impaired worker; (4) training adaptations and performance modifications. This information should be tabulated separately, however, based upon the degree of sight and the age of onset of disability. First, the distinctions between the "totally blind" and "partially sighted," while difficult to define and categorize, are important. They imply potential differences in job adaptations, psychological adjustments, etc. Secondly, information concerning the age of onset of disability is also vital. For example, if it were to be found that all blind managers were adventitously disabled after they had already become established in their field, the implications for training and employment in this field would require careful interpretations. Such a result would not indicate that such a goal was not feasible for the congenitally blind; however, such information might tell rehabilitation professionals something about potential barriers to a client with whom they were working. On the other hand, if blind managers were to represent a mix of partially sighted, blind, and congenitally and adventitiously disabled, information concerning the training and job adaptations of these individuals would be most useful in working with a client who wanted to enter management. Unfortunately, such information is available less readily and customarily than is needed.

Another important consideration in a discussion of jobs performed by visually impaired people is one of representativeness: should occupations primarily performed by a number of persons with visual impairments be included, or is employment by one person with severe visual impairment sufficient for the identification of a job as a field in which blind persons are employed? One might infer that the presence of one successful worker who has a severe visual impairment indicates that many other people have the potential for becoming employed in that field. On the other hand, a limited number of visually impaired workers in one occupation may indicate that the field is not a realistic choice for a large number of people. The isolated example may be a person with exceptional abilities, or the position may have been changed to such a degree that the job title is no longer valid for the job actually performed. However, in the vocational evaluation and counseling of visually impaired persons, it is better to err on the side of potential than to restrict clients inappropriately.

A third important issue in listing jobs held by visually impaired people is the rapid expansion of the types of jobs performed because of improved job modifications, vocational training, improvements in technology, adaptive devices, and low vision aids (Mellor, 1981, Scadden, 1982). Dalrymple (1975) described how the braille computer terminal was used by a mathematician, a systems programmer, a taxpayer service representative, and a newscaster. Improvements in computers since 1975 have significantly expanded career horizons for the person with visual impairments. For example, Maryland Computer Services offers the Information Thru Speech (ITS) computer system which provides information both visually and vocally. This technology is currently used by "blind lawyers, teachers, researchers, counselors, librarians, students, computer professionals, engineers, programmers, and professionals in many other professions" ("What is ITS?", 1982). ITS has not only expanded career opportunities, it has also been employed as a vocational training aid ("University of Pennsylvania Computer Center trains blind students in programming," 1982). Methods by which an individual, whether sighted or visually impaired, performs a job are changing as technology develops. Because of these changes and the increasing availability of technological aids, jobs that were once regarded as unrealistic or inappropriate for persons with visual handicaps may be increasingly seen as realistic and appropriate.

Expanding Job and Career Opportunities

Expanding job opportunities for partially sighted and blind people has been a frequent concern for individuals and organizations in the field of blindness (Aston, 1979; Baker, 1974; and Kirchner & Peterson, 1977). Only one-third of the working-age blind and partially sighted population is in the labor force; the sighted labor force participation rate is 75 percent. Of those visually impaired persons who are in the labor force, 80 percent are employed, whereas 92 percent of the sighted population in the labor force is employed (Kirchner & Peterson, 1977). The labor force participation gap of 42 percent between the sighted and visually impaired working age populations illustrates the severity of the problem of employment of visually disabled people. Proportionately, 42 percent more visually impaired individuals than sighted persons are likely to drop out of or never enter the labor force.

While society is often satisfied when a visually impaired person has only a job, many persons in the field of blindness and visual impairment, including providers and consumers of education and rehabillitation services, are questioning ". . . the quality of employment for that minority (25.7 percent) fortunate enough to be employed" (Kirchner & Peterson, 1980). This quality or underemployment problem may manifest itself when visually impaired people work fewer hours than they wish to be and/or are employed at jobs which ". . . are not commensurate in status, income, or challenge with their training, skills, and desires" (William Graves, 1983). Kirchner and Peterson (1980) report that in 1975 only 49 percent of visually impaired workers were employed 50-52 weeks annually, whereas 68 percent of the sighted force was employed 50-52 weeks annually. They also report that for visually impaired persons, education has less status and salary pay-off than for sighted workers. Clearly the level of vocational development of many visually impaired persons is not what it could be. As technology and the labor market change, consumer groups become more organized and articulate, and the rehabilitation system becomes more sophisticated, a greater emphasis is being placed on the career development of visually impaired people.

The concept of career development within rehabilitation and education programs for the visually impaired is of crucial importance and must be dealt with by the field. Career development as used here implies that a rehabilitation professional will identify the highest level of jobs for which an individual may be trained and employed and make recommendations for training programs and procedures that will help that individual reach that level of functioning. In many, if not in most cases, this will cause increased reliance on training--work adjustment training, vocational skills training, etc. This concept of career development implies that placement in any job is not adequate for visually impaired people. Rather, services should be provided to help an individual attain a job at his/her optimal level. For some multihandicapped persons, this may mean that very specific training techniques are used that will enable an individual to be employed in a sheltered industry. For a blind individual who functions at a higher level, it may mean vocational, technical, or professional training.

Rehabilitation and education professionals are most often caught in a bind between the desire to provide career development services for their clients that result in upward mobility and the need to help clients become employed at any level with the least cost and time invested. There is an important disparity between what jobs we know blind and visually impaired persons can do and those they most often do. Some blind consumers stress the importance of maximizing the career development of blind persons; agencies serving them, however, are often limited because of their resources to respond to this need.

While this disparity between what could be and what is will never disappear, rehabilitation professionals have the responsibility of facilitating the career development of their visually handicapped clients to the greatest degree possible. Consequently, vocational evaluators must concurrrently assess the maximum capabilities of an individual and provide recommendations to clients and counselors concerning how to meet these ultimate career goals. The development of both a short and long term rehabilitation plan within the realistic constraints of the local economy and client's personal situation must be developed by the counselor based upon recommendations by the vocational evaluator. This requires, of course, close communication between the counselor and the vocational evaluator and a knowledge by the counselor of how to interpret and use the vocational evaluation report.

Link's (1975) analysis of the state-of-the-art job placement of the visually impaired focused on the career development of blind persons. In his analysis several recommendations were developed that would aid in creating a more effective job placement process. These included:

(1) improved labor market information and the identification of feasible jobs for blind persons;

(2) increased use of vocational-technical training in public schools and community colleges;

(3) improved training of placement counselors;

(4) improved procedures in evaluating blind persons for competitive employment;

(5) improved job follow-up services;

(6) improved and increased personal, social, and work adjustment training; and

(7) improved and increased job modification and restructuring techniques.

Implications for Vocational Evaluation and the Utilization of Work Samples

In the delivery of rehabilitation services, vocational evaluation is often the mediating process between the person and the development of the rehabilitation plan. Consequently, vocational evaluation can be used to restrict the vocational opportunities for an individual, or it can be used as a vehicle for career development which gives an individual the opportunity to explore and be assessed for potential employment in a wide variety of occupations with a broad range of skill levels. Blind and visually impaired persons clearly have the potential to perform a wide variety of occupations. Vocational evaluators must select those assessment techniques that can validly assess blind persons for a wide range of jobs. To achieve this goal, the following recommendations are made:

1. Comprehensive information concerning jobs that can be performed by blind persons must be used in developing a vocational evaluation program. Most importantly, work samples and other assessment techniques should be selected that focus on occupations or fields at differing skill levels. Care must be taken not to stereotype individuals but to explore their interests and abilities comprehensively.
2. Vocational evaluation programs should be closely involved with skill training programs so that assessment for training may be effectively implemented. These would include: universities, community colleges, vocational-technical centers in the area, and private vocational schools.
3. Job and training adaptations and modifications must be considered in the vocational evaluation process. Work samples, on-the-job evaluations, and vocational classroom tryouts may provide an excellent opportunity to experiment with various job or training adaptation techniques. Vocational evaluators working with counselors and placement specialists may provide needed

consultation for employers, teachers, university instructors and others on ways to instruct or employ blind and visually impaired persons.

Finally, work samples are a useful component of vocational evaluation that can be used to address the career development issues of visually impaired persons. They can be used for assessment and exploration in a variety of fields. Work samples can also be used to assess skills needed on the job or in training and to experiment with various adaptive techniques. However, to use work samples effectively in the vocational evaluation process, accurate specific information concerning tasks performed on jobs and the skills needed to perform these tasks by blind and visually impaired people is needed.

DETERMINING THE REQUIREMENTS OF JOBS AND TRAINING PROGRAMS

To implement vocational evaluation effectively, precise information about the nature of specific occupations and clusters of occupations is necessary and should include specific analyses of jobs that blind persons presently do in terms of task descriptions and worker trait requirements. Professionals need to be able to analyze jobs and training programs to determine if a visually impaired person could basically do a job, what adaptations and characteristics would be required, and whether the job would be satisfying for the individual trainee or worker.

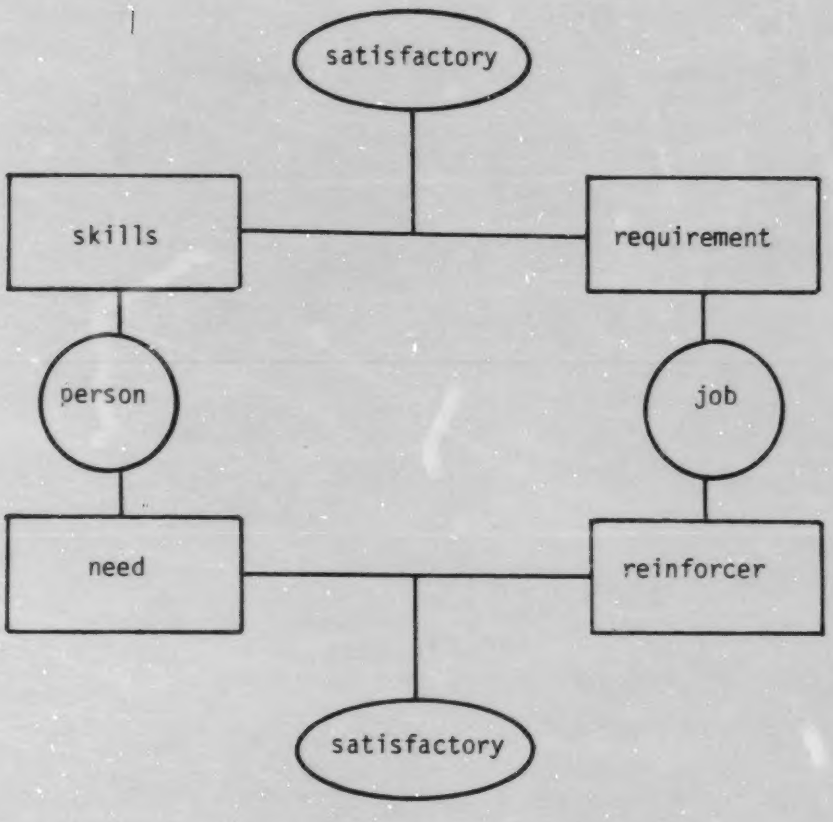
This kind of information is vital for developing and selecting work samples to be used in a vocational evaluation program. Work samples should reflect the conditions, tools, and materials of the job as much as possible, and work sample tasks that require the same characteristics and abilities as are required on the job or in the training program should be required. The utilization of job analysis in vocational evaluation is largely based on the Minnesota Theory of Work Adjustment (Rosen, Weiss, Hendel, Davis, and Lofquist, 1972) that provides a model for matching workers, skills, and needs with occupational requirements and reinforcers. Figure 1 provides a graphic representation of the and reinforcers. Figure 1 provides a graphic representation of the model. According to the theory, jobs must be analyzed in two ways: (1) in terms of their physical, mental, and emotional requirements and (2) in terms of the reinforcers provided to the worker. In vocational evaluation, the skills of the person and his or her needs are determined. For an optimum match between job and worker, the skills of the person must meet the requirements of the job (which results in the worker being satisfactory) and the reinforcers of the job must meet the needs of the worker (which results in satisfaction). Both satisfaction and satisfactory workers are important ingredients of the job placement process. Consequently, vocational evaluators must consider and obtain information about job requirements and reinforcers when doing job analysis.

Most job analysis procedures focus primarily on the determination of job skill and characteristic requirements. However, Rosen (et.al., 1972) has developed an instrument for analyzing reinforcers of occupations in a standard format that can be used with a client need assessment questionnaire. Rosen reported that occupational reinforcer characteristics have been identified for 184 occupations with 12 clusters of occupations which have similar occupational reinforcers.

Job Analysis

Some general resources are available that provide information concerning the requirements of jobs which are reviewed below. However, vocational evaluators will also need to gather local information about jobs and their requirements. Local analysis of job and vocational training programs can supplement general information.

Figure 1. Rosen's Theory of Work Adjustment


satisfactory
skills
requirement
person
job
need
reinforcer
satisfactory

ROSEN'S THEORY OF WORK ADJUSTMENT

Dictionary of Occupational Titles

Information available through the Department of Labor provides the most comprehensive general resources available. The 1977 edition of the Dictionary of Occupational Titles provides a job description of 12,099 occupations in the United States. This information is indexed several ways--by alphabetical title, number, and industry. Analyses of the worker trait requirements of each of these jobs were implemented by the Dictionary of Occupational Titles and have been privately published by two consulting firms under the following names: (1) The Classification of Jobs According to Worker Trait Requirements, VDARE, 1981; (2) the Encyclopedia of Job Requirements (McCrosky, 1981). The Guide to Occupational Exploration and Occupational Outlook Handbook are related documents published by the Department of Labor that provide general information about jobs.

Handbook for Analyzing Jobs

The Department of Labor (1972) has developed a manual that describes very specifically the process used in analyzing jobs for the DOT. According to this precedure, a job analysis requires that a systematic study of the worker be completed in terms of:

1. what the worker does in relation to data, people, and things (Worker Functions);
2. the methodologies and techniques employed (Work Fields);
3. the machines, tools, equipment, and work aids used (MTEWA);
4. the materials, products, subject matter, or services which result(MPSMS); and

5. the traits required of the worker (Worker, Traits)--aptitudes, interests, temperments, physical demands, training time and work conditions.

The recording form for job analysis is shown in Figure 2. Basically, the process employs: (1) descriptions of the tasks of the job; and (2) descriptions of worker traits and the relationship of the job to data, people, and things. Worker traits are numerically coded. This procedure is useful in that local job analyses can be implemented in terms consistent with other more general resources. Additionally, many vocational testing systems have keyed their results to the worker trait information of the DOT. Adding local job analyses that use the same language as the DOT can significantly help the vocational evaluation process. Additionally, the procedure can be adapted to analysis of the requirements of training programs.

A limitation of this job analysis procedure is the degree of specificity in analysis of physical demands of the job. Also, the format is not structured so that consideration of job adaptations and modifications is encouraged. However, a revision of the job analysis procedure has recently been published under the title of A Guide to Job Analysis (Materials Development Center, 1983) that does provide much more specific guidelines for analyzing physical demands. Despite these weaknesses, however, the job analysis procedure as used in the DOT can provide a useful benchmark in analyzing jobs to be performed by visually impaired persons.

U.S. Department of Labor
Manpower Administration

Figure 2

Estab. & Sched. No.________

JOB ANALYSIS SCHEDULE

1. Estab. Job Title____

2. Ind. Assign.____

3. S.I.C. Code(s) and Title(s)

______________________________ ____________ ____________________

---

4. JOB SUMMARY:

---

5. WORK PERFORMED RATINGS:

Worker Functions

D	P	T
Data	People	Things

Work Field__________________________Code______________

M.P.S.M.S.__________________________Code______________

---

6. WORKER TRAITS RATINGS:

GED 1 2 3 4 5 6

SVP 1 2 3 4 5 6 7 8 9

Aptitudes G__ V__ N__ S__ P__ Q__ K__ F__ M__ E__ C__

Temperaments D F I J M P R S T V

Interests 1a 1b 2a 2b 3a 3b 4a 4b 5a 5b

Phys. Demands S L M H V 2 3 4 5 6

Environ. Cond. I O B 2 3 4 5 6 7

DOT Title______________Code______________

Ind. Design______________WTA Group______________

7. General Education

   a. Elementary__________High School____________Courses__________

   b. College_____________Courses_________________________________

8. Vocational Preparation

   a. College_____________Courses_________________________________

   ____

   b. Vocational Education____________Courses_____________________

   ____

   c. Apprenticeship____

   ____

   d. In-Plant Training____

   e. On-The-Job Training____

   f. Performance on Other Jobs___________________________________

9. Experience____

10. Orientation____

11. Licenses, etc.____

12. Relation to Other Jobs and Workers

   Promotion: From__________________to________________

   Transfers: From__________________to________________

   Supervision Received: ______________________________________

   Supervision Given: ____

____

____

13. Machines, Tools, Equipment, and Work Aids

14. Materials and Products

15. Description of Tasks

The data in Fig. 2 is from the U.S. Department of Labor Manpower Administration, 1972.

Job Development Laboratory

Mallik and Sablowsky (1975) implemented a project that has interesting implications for work with visually impaired persons. In a demonstration project at George Washington University, a Job Development Laboratory was initiated to use job placement and rehabilitation engineering procedures with clients who had been unable to locate employment due to the severity of their physical disability. The procedure involved three major steps: (1) a precise functional assessement of the physical capabilities and functional skills of the client. Figure 3 shows the form used to document this functional assessment. Potential job placements were solicited from employers and a very specific analysis performed of the physical demands required of the job. Figure 4 illustrates the job analysis recording form used. Finally, as close a match as possible between the job and person was developed, and rehabilitation engineering procedures were used to develop needed adaptive devices for specific jobs.

The primary focus of the job development laboratory was not on dealing with visually impaired persons, although some clients did have this disability. However, this model has some interesting potential applications for working with visually impaired people that include:

(1) the development of an integrated, intensive service that combines functions of vocational assessment, job development, and job training (For more severely disabled persons, this "one stop" approach that teams several specialists in an intensive service effort may be most effective.);

(2) the emphasis on a very precise job analysis of physical demands

The George Washington University Medical Center
Job Development Laboratory
2300 Eye Street, N.W.
Washington, D.C. 20037

DATE____________

I. **Background Information:**

A. Name____________
B. Address____________
____
C. Phone____________
D. Age__ Birthdate____ Sex__
E. Marital Status____________
F. Dependents____________

G. Referred by ____________
Address____________
Phone____________
Date____________
Reason____________
H. Counselor____________
Address____________
Phone____________

I. Social Security #____________
J. Financial Assistance____________
____
K. Family Income____________
L. Insurance #____________
____
____
____

II. **Medical Characteristics:**

A. Diagnosis____________
____
B. Prognosis____________
____
C. Allergies____________
D. Medications____________

E. Physician____________
Phone____________
F. Precautions____________
____
G. Work Tolerance____________
H. Fatigue____________

I. Medical Rehab. Summary____________
____
____
J. Devices Presently Used (Orthotic & Adaptive)____________
____

III. **Physical Summary:**

IV. **Vocational History:**

A. Education: __Elementary __High __Vocational __Business __College __Grad School Other____
B. Vocational Experience:

Employer	Position	Dates	Liked/Disliked	Reason Job Terminated	Pay

C. New Job Search: __Yes __No How soon after job ended?________ Assistance____________
Methods Used: ____________ Type job sought________ Occupational Goal ________
D. Hobbies: ____________ E. Major time consuming activity: ____________

(Mallik and Sablowsky, 1975.)

Figure 3. Functional evaluation of physically disabled.

V. Physical Characteristics:

HAND DOMINANCE	GRASP								COORDINATION					BALANCE									REACH			
	Pinch	Palmer (hold phone)	Lateral (tumb to finger side)	Tip prehension (hold pencil)	Spherical (grasp door knob)	Opposition (thumb to finger tip)	Release (open hand)	Strength	Eye-hand	Hand-mouth	Spasticity	Ataxie	Finger dexterity	Sitting	Chair with arms	Wheelchair	Standing	Walking	VISION	Endurance	Stability	To 90°	Forward - distance	Height - distance	Side - distance	Strength - lift lbs
Severely Impaired																						R				
Moderately Impaired																						L				
Minimally Impaired																										
Intact																										

WHEELCHAIR EVALUATION												
Manufacturer:												
				Arms								
Manual	Electric	Width	Desk Clearance "	Removable	Desk	Adjustable	Need lapboard?	Does w/c fit?*	Manuver chair?	Apply brakes?	Need seat belt?	
												YES
												NO

DEVICES NEEDED (Orthotic &/or Functional)

VI. Functional Characteristics:

A. Level of Self-Care.

Score: ________

		DRESSING												BATH				HYGIENE							EATING					HAND MANIPULATION										HOUSEHOLD ACTIVITIES											
		Shirt	Pants	Bra	Socks - Hose	Shoes	Tie Shoelaces	Button	Snaps - Hooks	Zipper	Corset	Brace off/on	Belt	Upper Extremity	Lower Extremity	Feet	Back	Comb-brush hair	Wash Hair	Set Hair	Brush Teeth	Shave	Flush Toilet	Faucets	Use Utensils	Cut Meat	Drink from Glass	Cup with handle	Open Sugar Pack	Door Knobs	Light Switch	Drawers	Objects fr. floor	Clothes fr. closet	Scissors	Wind Watch	Radio - T.V. Switch	Handle Money	Open Envelopes	Carry Objects	Open Cans	Chop vegetables	Unscrew jars	Open milk carton	Prepare hot food	Light Oven	Buy Groceries	Laundry	Dispose Garbage	Wash Dishes	Change bed
LEVEL	Maximum Impaired																																																		
	Moderate Impaired																																																		
	Minimal Impaired																																																		
	Independent																																																		
	Time:																																																		
	Total Time																																																		

* Check Everest Jennings wheelchair prescription form.

FUNC. EVAL. FORM (Job Development Lab, The Geo. Washington Univ. Medical Center, 2300 Eye St., N.W. Washington, D.C. 20037)

Continuation of Figure 3.

Continuation of Figure 3.

VII. Functional Characteristics:

B. Ambulation	Yes	No
Walks Independently		
Brace		
Corset		
Cane		
Crutch		
Walker		
Manual Wheelchair		
Electric		
Stairs		
Curbs		

C. Transfers

Rise from Lying		
Rise from Sitting		
Bed		
Chair		
Wheelchair		
Toilet		
Tub		
Shower		
Car		
Stow w/c in car		

D. Transportation

Own Car		
Friend's Car		
Relative's Car		
Drives Independ.		
Taxi		
Mobile Care Van		
Bus		
Subway		
Train		
Drivers Licence		

VIII. Communication:

A. Motor Impairment

Receptive		
Expressive		
Hesitation		
Wrong Words		
Dysarthria		
No Speech		

B. Verbal Ability

Clear Enunciation		
Verbally Proficient		

	Yes	No
C. Hearing affected		

D. Reading

Vision Impaired		
Impairment Corrected		
Can Comprehend		
Hold Books		
Lift Books		
Turn Pages		

IX. Work Samples:

A. Writing

Hold Pencil		
Write		
Print		
Felt Tip Pen		
Ball Point Pen		
Pencil		
Erase		

B. Desk Activities

Desk Height Needed		
Manipulates Papers		
Paper Clips		
Stapler		
Rubber Bands		

C. Keyboard	Typing	Calcu.
Table Height		
Speed		
Errors		
Touch Type		
One Finger		
One Hand		
Universal Cuff		
Mouth		
Head Set		

D. Telephone

Reach		
Dial - Standard		
Dial - Touchtone		
Needs Extension Arm		
Needs Speaker Phone		

E. Filing

Cabinets		
Index Card		
Open		
Alphabetical		
Numerical		

F. Tape Recorder	Yes	No
Reach		
Press Switches		
Needs Foot Pedal		
Speech Legible		
Devices		

G. Microfilming

Threading		
Photographing		
Speed		

H. Xerox

Insert Key		
Feed Document		
Load Paper		
Remove Jammed Papers		
Put in Ink		
Clean Glass Plates		

I. Microfilm Editing

Insert Film		
Operate Knobs		
Record Corrections		

X. A. Home Situation

Apartment		
Detached Home		
Nursing Home		
Owns		
Rents		

B. Architectural Barriers:

# Steps Into House		
# Floors		
Elevator		
Ramps		
Door Widths		
Nonaccessible Rooms		
Parking		
Privacy		
Room for Equipment		

XI. Orthotic Evaluation:

(Mallik and Sablowsky, 1975.)

XII. Behavioral Characteristics:

A. Tests: Gen. Intell. Score______Test______Dates__________Verbal______Math__________

Kuder Interest Score______Highest Interests (1)______(2)______(3)________

B. Observations:

1. Appearance: Meticulous______Neat______Poor______Neglected______

2. Motivation (confidence and self perception)

	Very Good	Good	Average	Poor
a) Confidence in ability to learn				
b) Confidence in ability to succeed in work				
c) Desire to work				

3. Cooperation during interview

a) Participation
- ___ Initiated discussion
- ___ Responded appropriately
- ___ Short responses
- ___ Avoided speaking

b) Attitude
- ___ Amiable
- ___ Suspicious
- ___ Neutral
- ___ Hostile

4. Family Support:

Name		Emotional Support				Work Expectations				
	Spouse									
	Mother									
	Father									
	Siblings									

XIII. Physical Characteristics

A. Hand Dominance________________

B. Physical Evaluation

	RIGHT					LEFT				
	Strength	Range of Motion	Spasticity	Contracture	Pain	Strength	Range of Motion	Spasticity	Contracture	Pain
1. Shoulder:										
Flexion										
Extension										
Abduction										
Abduction										
Horizontal Abd.										
Horizontal Abd.										
2. Elbow:										
Flexion										
Extension										
3. Forearm:										
Pronation										
Supination										
4. Wrist:										
Flexion										
Extension										
5. Finger:										
Flexion										
Extension										

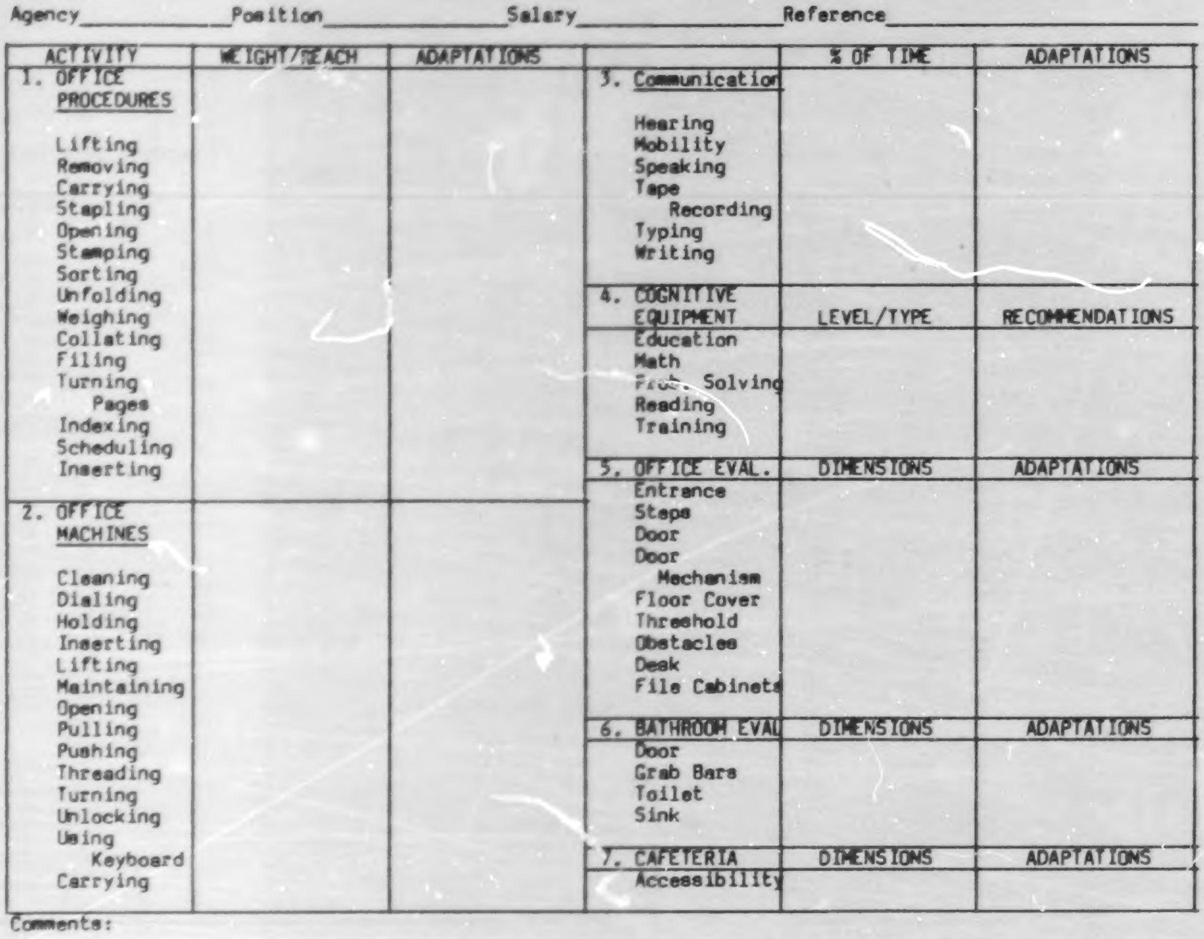
LEGEND

Strength:
P - Poor
F - Fair
G - Good
N - Normal

Spasticity:
S - Severe
Mo- Moderate
Mi- Minimal
N - None

(Mallik and Sablowsky, 1975)

Continuation of Figure 3.



Agency____________Position_______________Salary________________Reference____________________________

ACTIVITY	WEIGHT/REACH	ADAPTATIONS
1. OFFICE PROCEDURES		
Lifting		
Removing		
Carrying		
Stapling		
Opening		
Stamping		
Sorting		
Unfolding		
Weighing		
Collating		
Filing		
Turning Pages		
Indexing		
Scheduling		
Inserting		
2. OFFICE MACHINES		
Cleaning		
Dialing		
Holding		
Inserting		
Lifting		
Maintaining		
Opening		
Pulling		
Pushing		
Threading		
Turning		
Unlocking		
Using Keyboard		
Carrying		

	% OF TIME	ADAPTATIONS
3. Communicatio		
Hearing		
Mobility		
Speaking		
Tape Recording		
Typing		
Writing		
4. COGNITIVE EQUIPMENT	LEVEL/TYPE	RECOMMENDATIONS
Education		
Math		
Prob. Solving		
Reading		
Training		
5. OFFICE EVAL.	DIMENSIONS	ADAPTATIONS
Entrance		
Steps		
Door		
Door Mechanism		
Floor Cover		
Threshold		
Obstacles		
Desk		
File Cabinets		
6. BATHROOM EVAL	DIMENSIONS	ADAPTATIONS
Door		
Grab Bars		
Toilet		
Sink		
7. CAFETERIA	DIMENSIONS	ADAPTATIONS
Accessibility		

Comments:

(Rehabilitation Research and Training Center, The George Washington University, Washington, D.C. 20037.)

Figure 4. Job Analysis Form.

that is used to help define needed and potential job modifications (A validated procedure for this degree of specificity in job visual demands has not yet been developed. However, this approach points out how such an approach can help open up new avenues to those blind and visually impaired persons previously unemployed.); and

(3) the use of criterion-referenced functional work samples to determine basic functional skills possessed by the individual including both direct vocational skills and independent living skills important to work (e.g. mobility skills).

Physical Demands Job Analysis

Two additional job analysis resources have also attempted to provide a framework for job analysis to encourage recommendations for job modification. Lytel and Botterbusch (1981) have developed a manual entitled Physical Demands Job Analysis: A New Approach which describes a specific procedure for analyzing physical demands of jobs and for developing recommendations for job modifications. This process is illustrated on the summary form in Figure 5. An analysis of the following job areas is provided: (1) environmental and social conditions, (2) most common posture, (3) height and weight in manipulating objects, (4) handling objects, (5) moving objects; (6) deriving criteria for reaction control placement, (7) infrequent actions, (8) visual demands checklist, (9) classifications by strength, and (10) physical barriers.

Three categories of visual demands are analyzed:

Figure 5. Summary Form.

Employer Job Title____________________ DOT Title & Code__________

Supervisor____________________________ Telephone_______________

Company Name & Address____

____

____

Job Summary____

____

____

____

# of employees in same positions at work unit:

1 2 3 4 5 6 7 8 9 or more

# of employees in other positions at work unit:

1 2 3 4 5 6 7 8 9 or more

Environmental and Social Conditions Form

- 1 Inside
- 2 Outside
- 3 Heat
- 4 Cold
- 5 Wet
- 6 Noise
- 7 Vibr
- 8 Mech
- 9 Electric
- 10 Hot
- 11 Rad
- 12 Vent
- 13 Mov Ob
- 14 Sharp
- 15 Floor
- 16 Elevat
- 17 Light
- 18 Fumes
- 19 Others
- 20 Around
- 21 Alone
- 22 Supervision
- 23 Violent
- 24 Shifts
- 25 Equipment

Task Analysis Form

Most Common Posture

27 | 26 Walking (or Mobility)
28 Standing

29 Sitting

30S | 31 Stooping, Crouching or Kneeling

Height and Weight in Manipulating Objects

FOUR FEET OR MORE	BETWEEN FOUR FEET AND 18 INCHES	LESS THAN 18 INCHES
32 0 - 5 lbs.	38 0 - 5 lbs.	44 0 - 5 lbs.
33 0 - 10 lbs.	39 0 - 10 lbs.	45 0 - 10 lbs.
34 0 - 25 lbs.	40 0 - 25 lbs.	46 0 - 25 lbs.
35 0 - 50 lbs.	41 0 - 50 lbs.	47 0 - 50 lbs.
36 50+ lbs.	42 50+ lbs.	48 50+ lbs.
37S Storage	43S Divisibility	49S Storage

Handling Objects

50s | 51 Manipulating - Both
52 Manipulating - Either

53S | 54 Reaching over 15"
55S | 56 Reaching over the shoulder

57S | 58 Fingering
59S | 60 Lifting bulky objects 24" or more wide

Moving Objects

Carrying:

- 61 1 - 5 lbs.
- 62 1 - 10 lbs.
- 63 1 - 25 lbs.
- 64 1 - 50 lbs.
- 65 50+ lbs.
- 66 10 lbs. Beyond 30 ft.
- 67 Divisibility
- 68 Push/Pull - one hand
- 69 Push/Pull - two hands
- 70 Push/Pull - unequal
- 71 Push/Pull - Storage
- 72 5 - 10 lbs.
- 73 5 - 25 lbs.
- 74 5 - 50 lbs.
- 75 50+ lbs.

Continuation of Figure 5.

76 Speaking in Person
77 Hearing in Person

78 Speaking on Phone
79 Hearing on Phone

80 Conversation 50% of time with public
81 Hearing - full acuity

Driving and/or Machine Control Placement

82 Left hand control
83 Right hand control

84 Foot Control/ Pedals

85 Treading while sitting
86 Treading while standing

Infrequent Actions

87 Climbing with legs only
88 Climbing with arms and legs

89 Twisting the Head
90 Twisting the back

91 Must Crouch
92 Must stoop
93 Must kneel

94 Crawling
95 Reclining
96 Jumping

97 Rushing
98 Running
99 Throwing

Visual Demands Checklist

COMMUNICATION
100 Reading & Writing
101 Working Distance
102 Regular Format
103 Mentoring

MEASUREMENT/MANUIPULATION
104 Established Method
105 Measuring Devices

MOBILITY
106 Driving
107 Walking
108 Safety Hazards

Classification by Strength Requirements Form

109 Sedentary
110 Light
111 Medium
112 Heavy

Duration of Walking, Standing and Sitting

Walking	113	114	115	116	117	118	119
Standing	120	121	122	123	124	125	126
Sitting	127	128	129	130	131	132	133

Extended or Heavy Demands

134 Voice
135 Voice

136 Shoulder
137 Back & Knees

138 Whole Body
139 Whole Body

Driving

140 Assigned
141 Regular-Assigned
142 Short Trips
143 Major Duty
144 Central
145 May Use Own Vehicle

Physical Barriers Form

146 Parking
147 Route
148 Sign
149 12 Feet

150 Ramp
151 48" Wide
152 Slope
153 Handrail
154 Landings

155 Entrance
156 Door
157 32" Wide
158 Space
159 Threshold

160 Elevator
161 Access
162 Floor
163 Controls
164 Braille

165 Floors

166 Door
167 Handles
169 Thresholds
170 Obstruction

171 Rest Room
172 32" Wide
173 Passage
174 Vestibule
175 Sink
176 Controls

186 Telephone
187 Public
188 54"
189 30" Wide

190 Travel

Comments

Job Analyst________________________
Reviewed By________________________
Date of Job Analysis________________

From Lytel & Botterbusch, 1981.

(1) communication,

(2) measurement/manipulation, and

(3) mobility.

Figure 6 shows the "Visual Demands Checklist" (Lytel & Botterbusch, 1981). While this procedure will provide some information on visual demands of the job, it does not address such issues as illumination level, color requirements, near versus far vision requirements, etc., which are among the important elements in determining the visual demands of a job or work site. The analysis of visual demands and job modifications is not yet as specific as we might desire. However, the approach taken by this publication is very useful and is moving in a needed direction. The Rehabilitation Research and Training Center on Blindness and Low Vision is in the process of developing a procedure to analyze the visual demands of jobs (Miles and Graves, 1983).

Another project is presently being implemented by The Career Development Center in Florida entitled "Job Related Physical Demands." In this project, a physical demands job analysis procedure, similar to that described above, has been developed. In addition physical demands job analyses are being conducted on a variety of occupations throughout the country, and a manual is being developed that will: (1) describe specific physical demands of occupations and (2) provide recommendations for job modifications when a specific physical demand cannot be met. This project appears to have the potential of being an extremely valuable resource to rehabilitation professionals.

Figure 6. Physical Demands and Job Analysis & Visual Demands Checklist

Employer Job Title ____

To use this form:

A) Analyze the physical demands of the duties for the position under consideration.

B) Complete the Environmental Conditions Form.

C) Read the manual for complete definitions of the job characteristics listed below.

D) Make a decision about whether any of the job characteristics listed below seem to be true of the position. Take into account the main and critical job duties, the work environment and any other details from the interview.

E) The presence of one or more of these characteristics in the work may mean that accommodation regarding the blind might be considered in more detail.

Communication

100 Essential and extensive reading and writing is generally performed at a few locations.

101 Visual working distances are not fixed.

102 Most of the material read is printed or typed and the material is generally within a regular or standardized format.

103 Mentoring, particularly in a verbal manner, is the dominant activity.

Measurement/Manipulation

104 Manipulation of objects occurs within a well defined, established method or pattern.

105 Measuring devices could be converted to tactile, auditory, or enlarged scales rather than small print.

Mobility

106 Driving is limited (or unnecessary) and occasions of use can be controlled by the worker or the supervisor.

107 The work is not characterized by frequent required walking to a variety of non-routine locations outside the work unit where speed of mobility is essential.

108 Immediate work area does not contain major safety hazards from moving objects which could result in serious injury.

(Lytel and Botterbusch, 1981.)

Training Analysis

Training analysis is a procedure similar to job analysis, and the procedures and forms described above may be used in both job and training analysis. The purpose of the training analysis is to assess the skills and characteristics needed by individuals to enter and succeed in vocational training programs, to determine the typical instructional methodology, and to develop recommendations for modification of the training process based on the needs and abilities of the individual. Peterson and Housley (1982) have described a training analysis procedure that can be helpful to counselors and evaluators in making recommendations for vocational training, developing or modifying work samples to assess persons for entrance into training programs, and providing information to visually impaired persons about skills needed in vocational training. A recording form for this procedure is illustrated in Figure 7.

Training analysis procedures are becoming increasingly important. If the concern is for career development and upward mobility of visually impaired persons, then vocational training, whether in a trade class, a two-year technical program, or in a university, is crucial. Professionals, therefore, must have better information to provide effective recommendations for vocational training. While an understanding of job requirements is helpful, different skills and characteristics that are not required on the jobs are often needed to be successful in training programs. Similarly, instructional techniques may need to be modified to facilitate the participation of visually impaired persons in

Figure 7. Training Analysis Information Form

Vocational Program: ____________________
Instructor: ____________________ School: ____________________
Date: ____________________
Occupational training goal(s) of program: ____________________

Entrance criteria.

1. Physical skills: What minimal physical skills and abilities are required? What modifications could be made?

Skill	Modification
____Walking: ________	________
____Standing: ________	________
____Lifting: ________	________
____Carrying: ________	________
____Bending: ________	________
____Fine-motor: ________	________
____Speech: ________	________
____Vision: ________	________
____Hearing: ________	________

2. Educational skills: What minimal academic skills are required? What modifications could be made in teaching techniques to allow lower skill levels?

Math: ________	________
Reading: ________	________
Language: ________	________

3. Vocational Skills:

Basic tool use and knowledge required: (Which ones?) ____________________

Safety rules (specify): ____________________

Work behaviors. Which ones are most critical? ____________________

Other concerns? ____________________

Teaching techniques used. Which teaching techniques do you use? How could you modify these for the needs of a specific student?

Technique	Modification
____lecture: ________	________
____audio-visual: ________	________
____small gp. project: ________	________
____discussion: ________	________
____demonstration: ________	________
____study text: ________	________
____grade level: ________	________
____ind. projects: ________	________
____other: ________	________

Most all students proceed at the same pace? ______Yes ______No Suggested modifications? ____________________

What support services or materials would you need to help handicapped students in your program? ____________________

Other comments? ____________________

Person doing analysis: ____________________

(Peterson and Housley, 1982.)

the training program. Vocational evaluators need to use work samples that relate to training as much as possible so the evaluators can provide instructors with the following kinds of information:

(1) the strengths and weaknesses of the client related to specific vocational skills, work behaviors, job seeking skills, and physical skills, and

(2) learning ability and style, including recommendations on how to teach the individual (e.g., interpersonal style, teaching materials and techniques, working alone versus working with others, etc).

To provide these recommendations, specific training analysis information is needed by the vocational evaluator.

Several additional training analysis resources are available that can be adapted for use with visually impaired individuals. Several studies were conducted at Texas A & M University to determine entry-level training requirements for secondary school programs in vocational agriculture, homemaking, and automobile mechanics. These publications may be obtained from Vocational Special Needs, College of Education, Texas A & M University, College Station, TX 77843).

Project VESEP (Vocational Education-Special Education Project) has provided some very useful materials based upon detailed training analysis of secondary vocational education programs in Michigan (VESEP II, 1976). Career clusters which were appropriate for disabled secondary school age students were identified for training curriculums in Michigan. Detailed descriptions of the major vocational tasks for each of the career cluster areas was presented. Also identified were 160 prevocational enabling skills which the investigators found to be necessary for success in each training program and each vocational task of the program. Figure 8 presents a list of the career clusters and subclusters identified by Project VESEP. Figure 9 shows part of the checklist used to record student prevocational enabling skills. These skills were categorized as social, intellectual, and physical enabling skills. They were further subdivided into the following categories: gross motor, fine motor, perceptual-sensory, language, quantitative, comprehension, health and hygiene, personal/emotional, home responsibility, and school responsibility. Using Project VESEP procedures, a vocational evaluator should be able to identify training programs most suited for an individual.

In Project VERT (Thomas, 1982), entry-level skills for vocational education programs (automobile mechanics, basic wiring, carpentry, home economics, masonry, plumbing, welding and food preparation) were identified. A work sample for each of the areas was then developed to determine if the secondary school age student was ready to enter the vocational education curriculum. Peterson (1981) developed a manual with guidelines to implement vocational assessment programs in the schools so that recommendations could be made for entrance into vocational training programs. This manual described a comprehensive training analysis procedure.

Conclusion

In summary, several job and training analysis resources have been reviewed which have implications for visually impaired persons. A

Figure 8. Vocational Education Special Education Project career clusters and subclusters.

- ANR AGRICULTURAL/NATURAL RESOURCES
  - AM Agricultural Mechanics
  - LN Landscaping and Nursery
  - GF Greenhouse/Floriculture
  - FR Forestry and Recreation
- APS AUTOMOTIVE & POWER SERVICE
  - AM Auto Mechanics
  - AB Auto Body Repair
  - SE Small Engines
  - AR Appliance Repair
  - AC Air Conditioning
- CTS CLOTHING/TEXTILE SERVICE
  - CS Clothing Service
  - CC Clothing Construction
  - HF Home Furnishings
  - UP Upholstery
- CON CONSTRUCTION
  - BM Building Maintenance/Service
  - RC Residential Construction
- DST DISTRIBUTION
  - MH Material Handling
  - RT Retailing
- FPS FOOD PREPARATION & SERVICE
  - BP Baking and Pastry
  - FP Food Preparation
  - FS Food Service
- GCM GRAPHICS AND COMMUNICATION MEDIA
  - BB Bookbinding
  - SP Screen Printing
  - OL Offset Lithography
  - CP Commercial Photography
  - LP Letterpress Printing
  - DT Drafting
- HTH HEALTH
  - HC Health Care
  - HH Hospital Housekeeping
  - CC Child Care
- MFG MANUFACTURING
  - CW Combination Welding
  - MT Machine Tool Process
  - SM Soft Material Processes
- OBO OFFICE & BUSINESS
  - GO General Office Clerks
  - OM Office Machine Operators

(Vocational-Technical Educational Service, Michigan Department of Education, Mt. Pleasant, MI., 1976)

Student Name____________________________

Student Progress			Enabling Skill	Performance
			Given the necessary tools, Materials, equipment and requisite knowledge, the learner will:	
			GM 01 Sit or Stand	Erect in a normal sitting or standing position with/without support.
			GM 02 Crawl	Moving on hands and knees in a smooth, co-ordinated (fashion) manner.
			GM 03 Walk	To move from place to place.
			GM 04 Step or Jump	Over obstacles with both feet without falling
			GM 05 Throw or pitch	Small objects into or at a target with reasonable accuracy.
			GM 06 Manipulate three-dimensional materials	Using smooth coordianted movements with a minimum of dropping and fumbling.
			GM 07 Reach	In any direction by extending arms and hands to meet object.
			GM 08 Bend	By bowing downward and forward at waist without bending knees.
			GM 09 Kneel	And maintain balance without aid of another person.
			GM 10 Stoop	And maintain balance by bending legs and spine without aid of another person.
			GM 11 Perform manipulative tasks	Using arm and leg muscles in a coordinated fashion to operate levers, pedals, switches, etc.
			GM 12 Push, pull, lift and/or carry objects	Less than 20 lbs for an appropriate distance.

(VESEP II, Mt. Pleasant, MI: Vocational-Technical Education Service, Michigan Department of Education, 1976.)

Figure 9. Student prevocational enabling skills checklist.

detailed, field tested, reliable visual demands job analysis that focuses on job and training modification has yet to be developed. Resources have been identified which may provide assistance to counselors and vocational evaluators in understanding job and training requirements so that the vocational evaluation process may be implemented more effectively.

3

THE PROCESS OF VOCATIONAL EVALUATION AND THE ROLE OF WORK SAMPLES

Introduction

Vocational evaluation involves an intensive guidance/assessment process in which individuals explore jobs, are assessed, and develop a specific vocational objective. Vocational assessment begins with more general assessment techniques and proceeds through the use of work samples, situational assessments, and job try-outs. It concludes with the determination of the most appropriate occupation or training for the visually impaired individual and recommendations for rehabilitation or educational services. Occupational exploration and vocational counseling are used throughout the vocational assessment (Nadolsky, 1972; Peterson & Hill, 1982).

In an effective program of vocational evaluation, professionals gain information that helps them in working with clients. Visually impaired people benefit directly in that they understand more about the world of work and their ability to function in it; their self concepts often improve with successful experiences, and their behavior may improve as they understand why school and rehabilitation training programs can be useful to them in getting a job. If these outcomes are to occur, several principles must be observed.

1. Vocational evaluation must be individualized for each visually impaired person.
2. Vocational evaluation should occur in an environment that is as similar to the working environment as possible. Using work samples and other experimentally based techniques in vocational classroom and rehabilitation training facilities can aid this process.
3. Vocational evaluation must be implemented as a counseling and guidance process in which the evaluation techniques are discussed with the visually impaired person.

The resulting benefit for the visually impaired person will be recommendations for the most appropriate job placement or vocational training program.

Work samples are but one part of an individualized vocational assessment and counseling process. They are used most often during a concentrated vocational evaluation, but their use with visually impaired persons is not limited to this period. Work samples can also be employed as a single assessment technique to help confirm the progress an individual has made in an education or rehabilitation program, to provide information on which recommendations for entry into a specific training program can be based, and to predict success on a job. Whether work samples are used as an integral part of an intensive vocational evaluation plan or as single assessment tools, their use should be based on an individualized plan formulated with the visually disabled person designed to assess the education, rehabilitation, or career needs of that individual.

Nadolsky (1972) has described a process model of vocational evaluation in which a client first participates in a sequence of general assessment procedures, moves to a sequence more specific to an occupational cluster, and finally ends with the appropriate vocational objective. A variation of Nadolsky's model is illustrated in Figure 10. This model provides a descriptive picture of the vocational evaluation process found to be most effective by practitioners. It provides a guideline, however, that may be adapted to individual needs; a key to effective vocational evaluation is the individualized utilization and sequencing of vocational assessement and exploration techniques based upon the needs of the client. Toward this end an individualized vocational evaluation plan that specifies what information is needed and what assessment and exploration techniques will be used, is developed at the beginning of the evaluation process. Work samples are one useful technique, and individual work samples are used based upon their perceived usefulness for that individual. This process of vocational evaluation is summarized below.

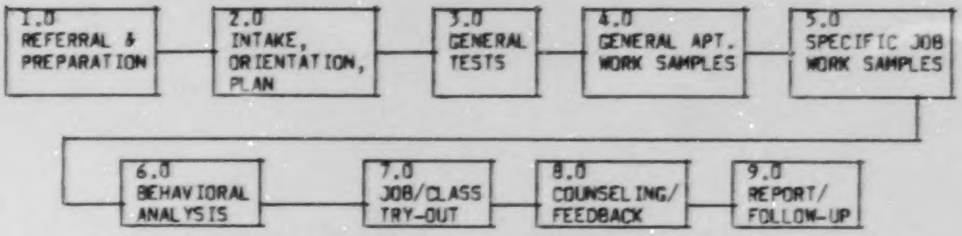
Referral

Referral to a rehabilitation facility or vocational evaluation center is the first step. The Vocational Evaluation and Work Adjustment Association (VEWAA, 1975) states that referrals are made for vocational evaluation or assessment services when it is not possible to:

(1) establish vocational or educational goals,

(2) determine the individual's skills, aptitudes, and interests,

Figure 10. Vocational Evaluation Process Model


1.0
REFERRAL &
PREPARATION
2.0
INTAKE,
ORIENTATION,
PLAN
3.0
GENERAL
TESTS
4.0
GENERAL APT.
WORK SAMPLES
5.0
SPECIFIC JOB
WORK SAMPLES
6.0
BEHAVIORAL
ANALYSIS
7.0
JOB/CLASS
TRY-OUT
8.0
COUNSELING/
FEEDBACK
9.0
REPORT/
FOLLOW-UP

1.0 REFERRAL: referral interview; review of referral information; client, parent preparation.

2.0 INTAKE/ORIENTATION: orientation to assessment; intake interview; establish individual assessment plan.

3.0 GENERAL TESTING: additional paper and pencil tests if needed.

4.0 GENERAL APTITUDE WORK SAMPLES: dexterity/coordination tests; physical skills; occupational exploration via media, group discussion, etc.

5.0 SPECIFIC JOB WORK SAMPLES: assessment on work samples related to specific jobs jobs/career areas or specific training programs; continued occupational exploration.

6.0 BEHAVIOR ANALYSIS: behavior observation and analysis in a controlled work setting.

7.0 JOB/CLASSROOM TRY-OUT/OBSERVATION: based on above results, jobs or training programs will be selected for a brief try-out period for observation of ability to perform there.

8.0 COUNSELING/FEEDBACK: talk with client to consider plans, recommendations, and needs. A formal staffing occurs if possible.

9.0 FOLLOW-UP: follow-up of outcome with an individual relative to recommendations. Summary report to teacher and parent. Complete vocational evaluation report.

(Nadalsky, 1972)

and/or

(3) establish a reasonable course of action for individuals with multiple functional disabilites (VEWAA, 1975).

The type of visually impaired individual referred to a vocation evaluation or assessment services center is usually one with the most severe disabilities. This is due to the fact that the referral agent needs assistance in establishing a vocational or educational goal, in determining the individual's skills and aptitudes, or in establishing a reasonable course of action. In rehabilitation settings, the decision to refer is usually the responsibility of a rehabilitation counselor. In educational settings, special education teachers usually initiate referrals for vocational evaluations.

Client Preparation

After referral, it is important that the visually impaired person, his or her family, the school, and/or rehabilitation personnnel understand and are prepared for the vocational evaluation process. Each person involved must be informed of the date, location, and purpose of vocational evaluation.

Preparing visually impaired individuals to participate in the vocational evalatuion process is critical. If an individual is to cooperate and be motivated to function at his or her potential, then he or she must understand the purpose of the vocational evaluation and must know what to expect. The vocational evaluator should be aware that some individuals are afraid or are resentful of being tested or evaluated.

There are a number of ways a vocational evaluator can reduce these fears and feelings. An orientation prepared in print, large print, braille, or audio-cassette can be mailed to the referral agent and the visually impaired person prior to a visit to the vocational evaluation center. The referral agent should discuss the orientation booklet and the vocational evaluation process with the client and his or her family and teachers. A visit to the vocational evaluation center should then be scheduled, if possible prior to beginning the process.

While visiting the vocational evaluation center, the client should tour the facility. If at all possible, the "tour guide" should be the vocational evaluator with whom the visually impaired person will be working during the vocational evaluation. The client should be given an opportunity to observe how work samples and other assessment techniques are used. He or she should be encouraged to talk with other visually impaired persons already participating in the same evaluation process. The vocational evaluator may wish to spend some time interviewing the client so that a basis for rapport between the client and center staff can be established. During this interview, the client and his or her family may have additional questions.

In a residential school setting or a public school program for the visually impaired student where students are referred as a group or as a regular event in the educational program, it might be useful if the vocational evaluator were to meet with teachers to explain the purpose of the vocational evaluation, to describe the services of the center and to discuss how the student and teacher might benefit from the students' participation. Following these meetings, the vocational evaluator should schedule a meeting with students and their families so that the points covered in earlier meetings can be addressed. Publications about the center and the vocational evaluation in print, large print and braille should be distributed as well. An audio-visual tape slide program might enhance the discussion for parents and some partially sighted students.

Orientation/Intake

One of the most important steps in vocational evaluation is the establishment of rapport between the visually impaired client and the vocational evaluators so that these two can develop an individualized vocational evaluation plan in as efficient a fashion as possible. Rapport can be established during the intake interview and in later meetings with the client. If groups of clients are scheduled, some additional work can be done by the evaluator in a group meeting to establish rapport.

Usually several clients will be involved in the vocational assessment process at one time. Having peers helps clients to feel more relaxed and less threatened. Usually the vocational evaluator will meet with the group and explain in detail what the schedule will be during the evaluation process. It must be made clear to the visually impaired clients that they can not "fail" the assessment. A positive tone is important, as is illustrated:

> "We are here to help you find out what jobs you want to do and can do. We will work with you so that you can make plans to get training for a good job. You can't fail the tests that we give. They are only to help you and us decide what job you want to do and can do."

Intake Interview

One individual interview should be held at the beginning of the vocational evaluation process. The goals of this interview are several: (1) to establish rapport with the client; (2) to gain information concerning the client's personal vocational interest and goals, socioeconomic background, and self-perceptions of abilities; (3) and to develop a tentative individualized vocational assessment plan.

Admission Staffings

After the initial interview, a pre-evaluation or admission meeting is often held. In these case staffings, the client is discussed by the various professionals who will be involved in the vocational evaluation. Typically, the vocational evaluator has the responsibility for coordinating and monitoring the vocational evaluation process.

Individualized vocational assessment plan

Based upon a review of referral information, the initial interview, and input of appropriate staff, an Individual Vocational Assessment Plan (IVAP) is developed. This plan specifies questions to be asked, assessment techniques to be used, and staff responsible. Figure 11 illustrates a form useful in documenting such a plan.

The key to individualized planning for vocational assessment lies in identifying questions about an individual that need to be answered. The most complex skill in effectively using work samples in vocational evaluation is knowing how to identify what needs to be known about an individual. A standard work sample battery given to all clients, while

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00					
9:00	Intake/ orientation and General Testing	Dexterity and Coordination Tests	Work samples	Job/ classroom Try-out or observation	Write reports
10:00					
11:00					
12:00					
	Lunch	Lunch	Lunch	Lunch	Lunch
1:00	General Testing	Work Samples	Work Samples	Staffing	Write Reports
2:00					
3:00					
4:00					
5:00	Score tests	Score tests	Score Tests		

Figure 11. IVAP sample schedule.

administratively convenient, generally will not meet the individualized needs of the visually impaired client. This is particularly true with task, learning, and job modification approaches to vocational evaluation. Work samples should be given as well to answer specific questions and needs which have been identified.

The process of vocational evaluation is one of continued hypothesis development and testing until conclusions are reached concerning the vocational potential and needs of an individual (Pruitt, 1977). Consequently, the plan may change as the vocational assessment process progresses. However, the development of an initial plan is a positive step to assure that the needs of the visually impaired client are met during the vocational evaluation.

Additionally, vocational evaluation often involves several professionals who may use particular observational or assessment techniques. The vocational evaluator may coordinate the assessment activities of vocational instructors, orientation and mobility specialists, rehabilitation teachers, workshop supervisors, etc. Figure 12 shows an example of recording the questions, method, staff, assignments, and results obtained during the vocational evaluation.

Implementation of Vocational Evaluation

Once the vocational evaluation plan has been developed, a number of methods designed to answer the assessment questions may be implemented. Different staff members may be involved in this process. According to the process model used in vocational evaluation, the assessment methods will move from general to specific, and from methods least like the work

Question	METHOD	STAFF	DATE	RESULTS
What are John's vocational interests?	Vocational Interest test	Rehabilitation Counselor		
	Interview John's parents	Teacher		
	Interview John	Vocational Evaluator		
Can John enter auto mechanics training?	Aptitude test	Vocational Evaluator		
	Work sample			

Figure 12. Individual Vocational Evaluation Plan.

environment to those most like it. Assessment of functional living skills, vocational counseling, and client and staff feedback can occur throughout the assessment process.

Feedback and Staffing

Vocational counseling and feedback occurs throughout vocational assessment. However, it is crucial that a counseling interview be held with the client at the end of the comprehensive vocational assessment process. This should occur no matter what scheduling or administrative arrangements are used. The vocational evaluator should discuss the results of the vocational evaluation process with each individual client.

A staffing in which the results of the vocational evaluation are discussed will be held at the completion of the assessment process. Conducting a staffing with teachers, clients, and/or families at the completion of the vocational evaluation is important because the findings are "fresh" at that point and can effectively influence the development of a useful Individualized Education Plan or Rehabilitation Plan. If such a staffing is not immediately possible, specific procedures must be developed by the school distict or rehabilitation agency to insure that the vocational evaluation recommendations are used in planning future rehabilitation services.

Reports and Communication

Vocational evaluation results must be used in developing the rehabilitation or education plan with the client. The evaluator must write a report that clearly, concisely, and comprehensively details the visually impaired persons's abilities and needs. The following type of reports may aid the process of communicating results:

(1) A comprehensive narrative report,

(2) A one-page summary with implications for counselors or teachers, and

(3) a one-page summary for the client and family members.

APPROACHES TO THE VOCATIONAL ASSESSMENT OF VISUALLY IMPAIRED PERSONS

Professionals in rehabilitation are concerned that visually impaired people be assessed vocationally so that a clear and valid picture of their vocational potential, skills, learning style, and needs may be obtained. An individualized process of vocational evaluation described previously is crucial in reaching this goal. However, the manner in which vocational evaluation is implemented depends greatly on how it is conceptualized. This chapter presents an overview of some of the major approaches in the vocational assessment of visually impaired people and issues related to each. It should be noted that while these approaches are presented separately, the approaches may and often are used together in the vocational evaluation process.

Trait Approach to Vocational Assessment

This approach is the basis on which psychological and vocational aptitude tests have been developed since the early 1900's. The approach assumes that:

1. individuals possess characteristics (often called aptitudes, personality traits, interests, temperaments, physical abilities, and other factors) which are relatively stable across

time and across situations or environments.

2. different occupations require different degrees and type of traits which can be determined through job analysis.
3. traits of individuals can be measured and compared with the trait requirements of jobs. A job or training program is considered appropriate when the job or training program requirements match the individual's characteristics.

Since the 1930's the Department of Labor (DOL) has conducted extensive investigations and analyses of occupations to identify both the tasks performed in jobs and the traits necessary to perform these tasks. This information is published in the 1977 edition of The Dictionary of Occupational Titles and in private publications (McCrosky, 1981, Field and Field, 1981). The traits identified by the Labor Department include: (1) worker functions; (2) general educational development; (3) aptitudes; (4) work conditions; (5) physical demands; (6) interests; and (7) temperaments. Each of these traits can be rated numerically according to the degree of a trait required. For example, one of the physical demands (strength) identifies the amount of weight that can be lifted by an individual. The strength factor ranges from sedentary (lifting 10 pounds maximum) to very heavy work (lifting more than 100 pounds).

Aptitudes defined by DOL include: general intelligence, verbal, numerical, spatial perception, forms perception, clerical perception, motor coordination, manual dexterity, color vision, and eye-hand-foot coordination. These aptitudes are rated on a 1 to 5 scale with "1" representing the highest ability level. The DOL has listed the physical ability of seeing as either present or not present and defines seeing as obtaining impressions through the eyes of the shape, size, distance, motion, color, or other characteristics of objects. The major visual functions are defined as follows (Department of Labor, 1977):

1. Acuity. Far-clarity of vision at 20 feet or more, near-clarity of vision at 20 inches or less.
2. Depth perception--Three dimensional vision. The ability to judge distance and spacial relationships so as to see objects where and as they actually are.
3. Field of vision. The area that can be seen up and down or to the right or left while the eyes are fixed on a given point.
4. Accommodation. Ajustment of the lens of the eye to bring an object into sharp focus. This item is especially important when doing nearpoint work at varying distances from the eye.
5. Color vision. The ability to identify and distinguish color.

The Dictionary of Occupational Titles (DOT) (U. S. Department of Labor, 1977) lists 12,099 job titles which have been analyzed by the DOL. Job analyses have been performed on these jobs to determine the presence and/or level of each trait and published in The Classification of Jobs According to Worker Trait Factors (Field & Field, 1981), and The Encyclopedia of Job Requirements (McCrosky & Perkin, 1981). The result is a "qualifications profile" for each job based on a numerical coding system. Figure 13 presents an example from The Classification of Jobs According to Worker Trait Factors (Field & Field, 1981) that illustrates coded qualifications profiles for several jobs.

Aptitude Tests

Along with efforts to analyze the traits and characteristics required of workers in jobs, there has been an effort to measure the degree and presence of these traits. A number of aptitude tests have been developed to measure both single or multiple traits. The most frequently used multiple aptitude tests are the Differential Aptitude Test (DAT), the Armed Services Vocational Aptitude Battery (ASVAB), and the General Aptitude Test Battery (GATB). The GATB was developed for use by the U. S. Employment Service and has been more extensively studied than any other aptitude test. Pencil and paper tests such as the Bruce Test of Sales Aptitude have also been developed to measure a single or specific aptitude.

Performance tests have been used in recent years to measure physical or skill traits required on the job. These tests include measures of dexterity and coordination such as the Crawford Small Parts Dexterity Test and the Bennett Hand-Tool Dexterity Test as well as work sample systems. Trait oriented work samples have been developed in which work-like tasks have been used to measure specific worker traits and aptitudes. For example, one work sample in the JEVS system has been designed to measure spatial aptitude. This trait is measured by a task or work sample which requires the evaluee to assemble pipes according to a drawing. Large print, embossed diagrams, or CCTV may be used to adapt this technique for visually impaired persons. Several commercial work sample systems have been specifically developed to measure aptitudes and traits. These systems include:

1. The Jewish Employment and Vocational Services System (JEVS)
2. TOWER
3. Micro-TOWER
4. The Hester Evaluation System
5. the VALPAR Component Work Sample System
6. the McCarron-Dial Work Evaluation System

(See Chapter 9 for a review of these systems.)

Worker Trait-job Matching Systems

Specific aptitude tests, such as the General Aptitude Test Battery (GATB), have been related to the worker traits as defined by the Department of Labor. Several individuals have developed a procedure to use a variety of tests, work history, and other information to develop a worker trait profile for an individual that may then be matched with aptitude requirements of jobs as analyzed by the Department of Labor. McCrosky and Perkins (1981) and Sink and Field (1981) have developed two similar worker trait approaches based on the DOL trait system. The worker trait-job matching process involves several steps that are summarized below:

1. Identify a worker trait profile for the individual being assessed.
2. Compare this profile of the individual's traits with the trait requirements of the jobs as published in the Classification of Jobs (Field and Field, 1981) or Encyclopedia of Job Requirements (McCroskey, 1981).
3. Based on this comparison, recommendations for job training, placement or other services may be made.

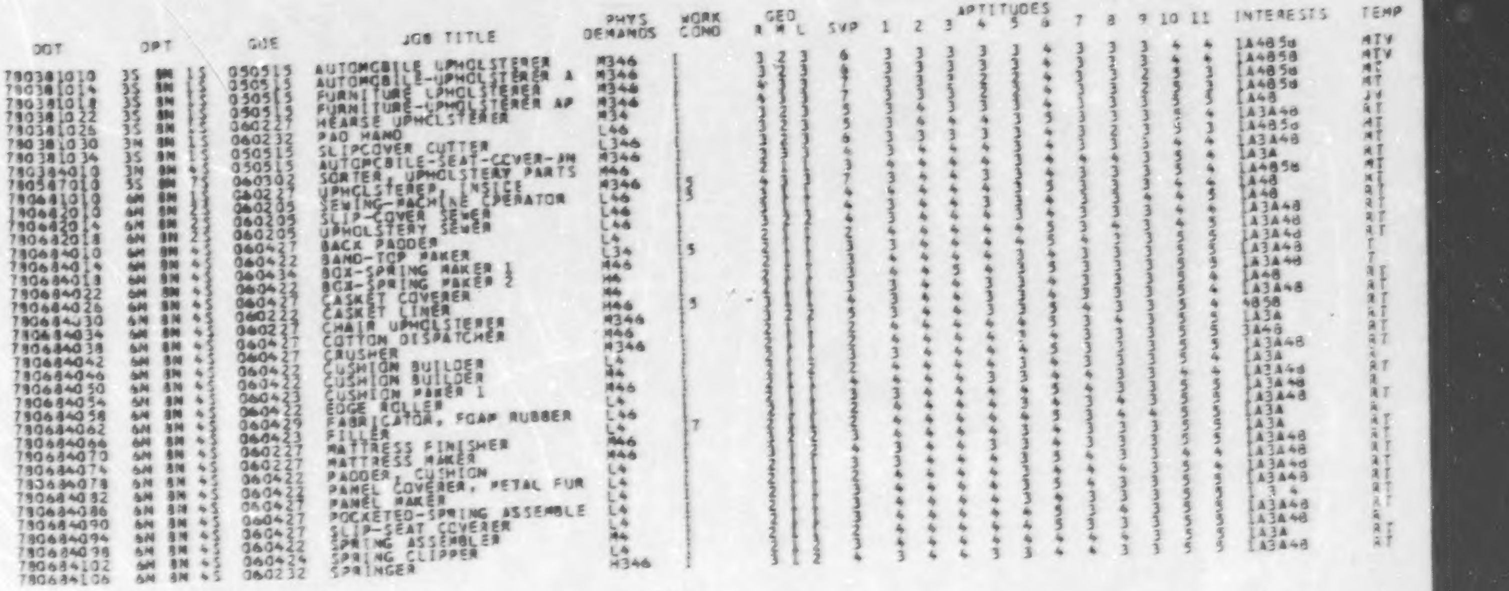
To implement the process several resources are needed. These include: (1) Dictionary of Occupational Titles, (2) a publication or computer based system that lists qualifications profiles of jobs, (3) the Handbook for Analyzing Jobs, and (4) a worker trait profile worksheet.

Computerized matching systems of assessed worker traits and job requirements are used by an increasing number of work testing systems (Hester and McCarron-Dial), and micro-computer based job matching systems are becoming increasingly available. With these, a numerically coded worker trait profile based on DOL procedure is developed that describes the abilities and interests of the person. This profile is entered into the computer. A match is made between the worker profile and job requirements profiles stored in the memory of the computer. A print-out of the matches is then readily available.

The process of developing the worker trait profiles for an individual involves several steps depending upon the individual's background, and how test results are used. Past job history and test results are converted into numerical worker trait ratings. If a change in certain worker traits has occurred, (due to an industrial accident, for example) an estimate is made about the present functioning of the individual. The procedure for making this estimate follows:

1. Identify past jobs held by the individual and the worker traits required on those jobs. This is done through complete work history, identification of DOT numbers for past jobs, and determination of worker traits via the Classification of Jobs Manual (see Figure 13).

Figure 13. Example from The Classification of Jobs According to Worker Trait Factors.



DOT	OPT			GOE	JOB TITLE	PHYS DEMANDS	WORK COND	GED			SVP	APTITUDES											INTERESTS	TEMP
								R	M	L		1	2	3	4	5	6	7	8	9	10	11		
780381010	3S	8M	1S	050515	AUTOMOBILE UPHOLSTERER	M346		3	2	3	6	3	3	3	3	3	4	3	3	3	4	4	1A4858	MTV
780381014	3S	8M	1S	050515	AUTOMOBILE-UPHOLSTERER A	M346		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A4858	MTV
780381018	3S	8M	1S	050515	FURNITURE UPHOLSTERER	M346		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A4858	MT
780381022	3S	8M	1S	050515	FURNITURE-UPHOLSTERER AP	M346		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A4858	MT
780381026	3S	8M	1S	060227	HEARSE UPHOLSTERER	M34		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A48	JV
780381030	3N	8M	1S	060232	PAD HAND	L46		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780381034	3S	8M	1S	050515	SLIPCOVER CUTTER	L346		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A4858	AT
780384010	3N	8M	4S	050515	AUTOMOBILE-SEAT-COVER-IN	M346		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	MT
780547010	5S	8M	7S	060302	SORTER, UPHOLSTERY PARTS	M46		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A	RT
780681010	6M	8M	1S	060227	UPHOLSTERER, INSIDE	M346	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A4858	MT
780682010	6M	8M	2S	060205	SEWING-MACHINE OPERATOR	L46	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A48	RT
780682014	6M	8M	2S	060205	SLIP-COVER SEWER	L44		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A48	RT
780682018	6M	8M	2S	060205	UPHOLSTERY SEWER	L44		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684010	6M	8M	4S	060427	BACK PADDER	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684014	6M	8M	4S	060422	BAND-TOP MAKER	L34	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	T
780684018	6M	8M	4S	060434	BOX-SPRING MAKER 1	M46		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	T
780684022	6M	8M	4S	060422	BOX-SPRING MAKER 2	M6		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	R T
780684026	6M	8M	4S	060427	CASKET COVERER	M6		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A48	RT
780684030	6M	8M	4S	060222	CASKET LINER	M46	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684034	6M	8M	4S	060227	CHAIR UPHOLSTERER	M346		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4858	RT
780684038	6M	8M	4S	060427	COTTON DISPATCHER	M46		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A	RT
780684042	6M	8M	4S	060427	CRUSHER	M346		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3A48	RT
780684046	6M	8M	4S	060422	CUSHION BUILDER	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684050	6M	8M	4S	060422	CUSHION BUILDER	M4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A	R
780684054	6M	8M	4S	060423	CUSHION MAKER 1	M46		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684058	6M	8M	4S	060422	EDGE ROLLER	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	R
780684062	6M	8M	4S	060429	FABRICATOR, FOAM RUBBER	L46		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	R T
780684066	6M	8M	4S	060423	FILLER	L4	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A	R
780684070	6M	8M	4S	060227	MATTRESS FINISHER	M46		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A	R T
780684074	6M	8M	4S	060227	MATTRESS MAKER	M46		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684078	6M	8M	4S	060422	PADDER, CUSHION	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684082	6M	8M	4S	060422	PANEL COVERER, METAL FUR	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684086	6M	8M	4S	060427	PANEL MAKER	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	RT
780684090	6M	8M	4S	060427	POCKETED-SPRING ASSEMBLE	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1 3 4	RT
780684094	6M	8M	4S	060427	SLIP-SEAT COVERER	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	R
780684098	6M	8M	4S	060422	SPRING ASSEMBLER	M4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A48	R
780684102	6M	8M	4S	060424	SPRING CLIPPER	L4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1A3A	RT
780684106	6M	8M	4S	060232	SPRINGER	M346		3	1	2	4	3	4	4	3	3	4	4	3	3	5	5	1A3A48	RT

Field & Field, 1981

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2. Use tests, work samples, situational assessment or other vocational evaluation tools to provide further determination of aptitudes and worker traits.
3. A profile on the individual's worker traits is developed. At this point a worker trait worksheet will be full of numbers representing worker traits demonstrated by the individual on past jobs, tests, work samples, situational assessment, etc. The evaluator should then look at trait ratings in each column and identify the rating for the highest skill level. This number should be listed at the bottom.
4. Compare the worker traits of the individual with the required worker traits for various jobs as published in the manual: Classification of Jobs or Encyclopedia of Job Requirements.

Problems with the Trait Approach

There are a number of problems in using vocational aptitude tests--even work samples--with visually impaired persons. Most aptitude tests--GATB, ASVAB, DAT, etc.--are timed tests which may put a visually impaired person at an unfair disadvantage. Most of the norms against which the performance of a visually impaired person would be compared were developed on a sighted population. The issue here is not whether or not a comparison of a visually impaired person with sighted persons is appropriate since the visually impaired person will have to compete in the marketplace for jobs with sighted people. The issue is whether or not it is appropriate to assess a visually impaired person's aptitude level using a test which assumes the evaluee to have normal vision.

Problems also exist with the limited physical demand information on the job qualifications profiles. For vocational evaluators assisting visually impaired persons to learn about jobs or designing work samples to help these individuals make better career decisions, a rating of the sight requirement as "significant" or "not significant", as used in DOL's worker trait profile, leaves out information needed about the visual demands of a job. Additionally, a number of jobs listed in the *DOT* as requiring vision are successfully performed by totally blind workers. Examples include the job of sewing machine operator and that of occupational therapist aide.

Another difficulty in the use of the traits as defined in the *DOT* is the lack of occupational specificity in the traits. For instance, the *DOT* traits have relatively little emphasis on people skills that are required on many jobs. This lack of occupational specificity is a result partially of the difference between the *DOT*'s need to develop a classification of worker traits that can be applied to all occupations in the United States and the need of employers and professional groups to more specifically determine the traits needed for specific jobs and the traits needed to adequately assess a specific individual. A recent evaluation of the *DOT* has questioned the worker trait structure; it has recommended that the job analysis techniques and the way worker trait structure is defined be reconsidered in future editions (Miller *et*. *al*, 1980).

Another concern is the way aptitudes and traits to be measured are conceptualized. For example, in some jobs some different traits and characteristics may be required for a visually impaired person to perform a job than may be required for a sighted person. Such traits and characteristics important for blind persons may not be identified in a test designed for the sighted. Consequently, a blind person may be assessed for traits that are less important and not assessed for those that are critical for his or her successful job performance.

Traits and Visually Impaired Persons

In a 1975 national conference on the use of work samples with the blind (Bauman, 1976), the following traits were regarded by the conference participants as important traits to be considered in the development and use of work samples with persons who have severe visual impairments: kinesthetic memory, spatial relations, imaging ability, auditory discrimination, sound localization, tactile discrimination, physical orientation, and equilibrium. Richterman (1982) lists 62 traits or work abilities which need to be addressed in the development of work samples used to evaluate the work potential of individuals with visual impairments (see Figure 14.) Additional research concerning traits especially important for blind persons in different types of work needs to be implemented.

The trait approach to assessment of the vocational potential of visually impaired persons has been reported by Richterman (1982), who described a series of research and development efforts undertaken by the National Industries for the Blind (NIB) at its national demonstration sheltered workshop, Royal Maid Association for the Blind, Inc. (Hazlehurst, MS). Richterman states that NIB has developed a work abil-

Figure 14. Traits for work potential evaluation.

WORK ABILITIES

Constructive Imagination--the ability to synthesize the components of an object so as to obtain a correct concept by relating some of the components of the object to its function.

Acceptance of Responsibility--the willingness to abide by established work regulations and general work procedures in a cooperative, agreeable, and mature manner.

Independent Action--the degree to which an individual requires supervision and/or emotional support from others in order to successfully complete his work.

Dependability--the degree to which the person adheres to time demands. Daily attendance and punctuality would be indicators of dependability.

Initiative--the degree to which the person is a self-starter and shows the ability to orgainize his work in such a way as to be as self-reliant as possible.

Dress and Personal Hygiene--the degree to which the person maintains his outer appearance and person by acceptable standards for a given situation.

Worker Self-Concept--the individual's verbalized report of what he thinks of himself as a productive employee.

Frustration Tolerance--the degree to which the individual can cope with his anxieties and channel his energies into productive work areas.

Reaction to Criticism--the manner (cooperative, passive, aggressive, aggressive-passive) in which a person responds to criticism focused upon improving his work performance.

Reaction to Praise--the manner in which the client responds to praise.

Reaction to Authority--the manner in which the individual reacts to supervisory personnel in the work setting. Cooperativeness.

Reaction to Co-Workers--the person's reaction to peers of both sexes.

Modulation and Projection of Voice--the ability to speak with proper enunciation, volume, and voice tone.

Posture--the ability to hold the body in a socially approved manner without evidence of inappropriate posture or "blindisms."

Facial Expression--the ability to maintain pleasant and appropriate expressions in dealing with others.

Sense of Humor--the person's general cheerfulness and his ability to respond to humorous situations and actions, even at his own expense.

Social Conduct--the appropriateness of a person's behavior in interpersonal relationships (individual or group), including table conduct and manners.

Leadership Potential--the degree to which the individual appropriately asserts himself and/or is dominent in group situations such as team tasks.

Motivation (Work Attitude)--the degree to which one invests himself emotionally and physically in his own vocational rehabilitation program.

Continuation of Figure 14.

ORIENTATION AND MOBILITY

Physical Orientation--the ability to find and keep one's auditory horizon and to discern the location of and the relaionship between points of reference.

Sound Location--the ability to determine the direction and distance of the source of sound in relation to position of the body.

WORK PERFORMANCE

Work Quality--the degree of accuracy and adherence to quality control standards demonstrated by a person's work.

Ability to Use Hand Tools--the ability to correctly select, use, and care for hand tools.

Reaction and Adaptability to Power Machinery--the ability to control or overcome one's fear of power machinery, and to develop a tolerance for noise, and a safety awareness for possible hazards of said equipment.

Reaction to Various Type Materials and Work Conditions--the ability to tolerate materials and work conditions normally considered undesirable.

Care and Use of Equipment--the ability to properly use and/or operate hand and power equipment and to perform the necessary maintenance services.

Time and Motion Economy Consciousness--the ability to maintain awareness of efficient production methods and to use a smoothly flowing work rhythm.

Safety Awareness--the ability to maintain awareness of hazards within the area and to retain knowledge concerning all appropriate safety regulations.

Orderliness--the ability to maintain one's work and work station in a neat, effective manner.

Application to Work--maintaining a sustained effort despite internal and/or external interfering factors, and the degree to which the individual is able to effectively channel his energies into productive work.

Material Control--the ability to maintain the appropriate direction of various types of raw materials during processing by hand and power tools.

BASIC MATH SKILLS

Counting Ability--the ability to correctly and repitively count to 100 and designate individual items for each number.

Measuring Ability--the ability to correctly determine units of linear measurement through the use of a braille or regular ruler, to determine weights through the use of a scale, and to determine units of time through the use of either a braille or regular clock.

Numerical Ability--the ability to perform basic mathematical operations (add, subtract, multiply, divide) and to perform basic concepts such as making change.

LEARNING STYLE AND ABILITY

Learning Ability--the thoroughness and facility with which knowledge is acquired and abilities are developed.

Following Written or Braille Instructions--the ability to appreciate and retain written or braille instructions.

Following Verbal Instructions--the ability to appreciate and retain verbal instructions.

Following a Model--the ability to construct an object by examining the object model.

Kinesthetic Memory--the ability to appreciate and retain proportion, distance, and contour by touch.

Continuation of Figure 14.

Memory for Sequence of Operations--the ability to follow routinely the appropriate sequence of steps in a complex operation.

Retention--the ability to preserve knowledge and develop ability so as to make recall and recognition possible and relearning easier than learning new material.

Reasoning Ability--the ability to make judements or decisions independently and with a reasonable amount of accuracy.

Recognizing and Correcting Errors--the ability to distinguish an error in one's work and the ability to initiate corrective measures.

VISION

Ability to Use Residual Vision--the ability to make the most effective use of the residual vision in combination with all of the remaining senses.

PHYSICAL-PERCEPTUAL CHARACTERISTICS

Finger Dexterity--the ability to move a finger or fingers purposefully.

Manual Dexterity--the ability to move one or both hands purposefully.

Tactile Strength--the degree to which a person can utilize is hand and finger strength.

Bi-manual Coordination--the ability to move both hands so as to maintain any desired relationship between them.

Eye-Hand Coordination--the ability to move one or both hands to a point focused upon the eyes when the person possesses usable vision.

Hand Food Coordination--the ability to move the hands and feet in any combination so as to maintain the desired relationship between them.

General Coordination--the ability to move various parts of the body simultaneously so as to maintain any desired relationship between them.

Size Discrimination--the ability to distinguish the difference in sizes of objects.

Form Discrimination--the ability to distinqush the difference in forms of objects.

Color Discrimination--the ability to distinguish the difference in basic colors and their shadings when the person possesses usable vision.

Tactual Perception--the ability to distinguish temperature, texture, and contour by touch.

Lifting Tolerance--the ability to lift various amounts of weight and to be successfully able to work with these weights over prolonged periods.

Carrying Tolerance--the capacity to carry various sized objects with various weights and to be able to successfully do this for prolonged periods of time.

Bending Tolerance--the capacity to bend the body for extended periods.

Sitting Tolerance--the capacity to work in a sitting position for extended periods.

Standing Tolerance--the capacity to work in a standing position for extended periods.

Push-Pull Tolerance--the capacity to either push or pull, with the arms and/or legs, objects having various resistant forces over extended periods.

Richterman, 1982.

ities approach to the vocational evaluation of blind and visually impaired persons. With this approach, the evaluator uses the concept of work abilities as a special application of the trait approach to vocational assessment. Jobs are analyzed to determine work abilities required; the individual is assessed with strong emphasis on the use of work samples, and an appropriate match is made. With this approach, a vocational evaluator will use various psychometric instruments and work tasks to evaluate a series of work abilities that are considered important for success. This approach was developed by NIB as it began to employ more multi-handicapped blind persons in the workshops and as it began asking these same individuals to produce more varied products. Consequently, the work abilities measured by the NIB approach focus most directly on jobs available in sheltered workshops and on similar jobs in competitive industry.

Vocational evaluators who elect to use a trait approach in vocational evaluation will need much more specific information than is contained in the DOT or its supporting materials. These evaluators may employ additional resources such as:

1. descriptions of jobs and methods of doing jobs held by visually impaired persons;
2. professional literature by various unions, trade societies, and other groups concerning important worker traits;
3. Project VESEP (described above) and other studies that identify entry level skills for vocational training;
4. physical demands job analyses that can be implemented locally; and

5. job modification and adaptation studies.

Task Approach to Vocational Assessment

To some degree, all procedures of vocational evaluation include elements of the trait approach. Since the trait approach tends to focus on abstract or theoretical traits (e.g. kinesthetic memory and reasoning), the vocational evaluator as well as the visually impaired person often does not know if the person can perform the actual tasks of a job. However, there may or may not be a relationship between job task performance and the possession of worker traits identified as job performance requirements. An individual may possess the general worker traits as measured by an aptitude test, for example, but may not be able to perform the job tasks (see Figure 15). Through the vocational evaluation process, an individual may be found to have the required general intelligence, verbal aptitude, and other skills required of welders, but he or she still may not be able to perform the job tasks for a number of reasons, including lack of training. Additionally, the particular traits defined and assessed by the DOT may not be the most significant ones required by a job. For example, the possesssion of human relations skills is not identified as a trait by the DOT; it is critical, however, in the job performance of a person employed as a rehabilitation counselor, for example.

Due to these kinds of shortcomings, the task approach to vocational evaluation was developed to measure a person's ability to perform job tasks. The task approach uses techniques that "utilize work, real or

Figure 15. Relationship of aptitudes to tasks

Example:
Production Line
Welder
819-684-010

TASKS	G	V	N	S	P	W	K	F	M	C	
Turns valves to release gas and oxygen											
Clamps cable onto work											
Strikes arc											
Guides electrode along horizontal weld line											

Note: If you can do a task, you also have the aptitude. But, you can have tested aptitude for something and still not be able to do the task.

simulated, as the focal point of assessment" (VEWAA, 1975). These techniques include work samples that use the tasks, tools and materials of actual jobs or clusters of jobs. Additionally, situational assessment, the systematic observations of worker skills and behaviors in actual work settings, has been increasingly used to assess the ability of a disabled person to perform a job. In other words, the performance of actual job tasks has been used, not only to assess more general work traits, but to determine an individual's ability to perform the tasks and use the skills associated with a particular job or group of jobs. The assessment center movement in business and industry is employing the task approach in the asssessment of technical, managerial, and professional personnel. Thorton and Byham (1982) claim that task assessment is much more effective than the trait oriented selection procedures of the past.

Present Performance Approach

Most vocational assessment focuses on developing a profile of an individual's present skills which, when compared with the current requirements of jobs, can be used to recommend job placement or training and other services that are designed to improve skill levels. The focus may be on either task or trait assessment as outlined previously. When the discrepancy between the desired skill level and present performance is not too great, or discrepancies do not occur in too many areas, training, skill development, counseling, or medical services may be recommended. However, if discrepancies are great, another vocational choice recommendation may be made.

Assessment of present skills can be very useful when the result is a specific set of recommendations that can be easily translated into instructional, training, or counseling objectives. Too often, however, techniques used in present skill assessment do not have the same focus as instruction and training. The result is vague recommendations for "work adjustment training," "training in grooming," etc. with the specific assessment of skills levels being left to an instructor or counselor. For instance, an intelligence test measures present performance related to intelligence. However, very little use can be made of the results in terms of prescribing instruction. On the other hand, if it is known that a client wants to be a plumber, and a task oriented work sample indicates he cannot presently identify and use a pipe wrench, this information can be very valuable in prescribing specific instruction. If, however, results from the same work sample are expressed only in terms of the percentile scored, this again is information that can not be easily used to prescribe specific intervention techniques.

Halpern and Irvin (1981) have developed a model of assessment that is intended to make assessment as instructionally relevant as possible. They entitle their model "Program Related Assessment," which is defined as "the close relationship that exists between the measurement of client strengths and weaknesses and the delivery of appropriate services in response to such functional assessment." The model has several steps:

1. Select content areas of concern--on the broadest level, vocational skills, work behaviors, independent living skills, etc--each of these may be additionally divided.

2. Select assessment instruments to be used. Care must be taken to select instruments that provide instructionally relevant information. Irvin and Halpern (1979) have reviewed a variety of program related assessment instruments useful for retarded persons. Some of these may be useful with multihandicapped blind persons as well.
3. Measure current performance--the actual assessment process.
4. Determine need for service. An analysis of the discrepancy between the requirements of the job (or other environments) is analyzed and a determination made if service is needed.
5. Determine service priorities--describe which skills are most important.
6. Develop goals and objectives.
7. Implement and monitor programs.
8. Evaluate program outcomes.
9. Close services or develop new plan.

Yeadon (1978) has published a listing of instructional objectives to teach daily living skills to persons with severe visual impairments. This listing could be used as the basis of the pre-vocational assessment program of a visually impaired person's present daily living skills. Specific recommendations for an independent living training program could then be made by a vocational evaluator after assessing current daily living skills level, thereby linking the vocational evaluation process to a training or instructional process.

Learning Assessment Approaches

Present performance assessment can determine whether or not an individual possesses a specific skill and what skills need to be learned. However, only limited information can be gained concerning whether or not an individual can learn a task and what instructional or counseling approaches will be most effective. Unfortunately, however, present performance assessement is often used to predict the future learning ability of an individual. For instance, if a person does poorly on a plumbing work sample or a spatial aptitude test, it might be concluded that he/she cannot become a plumber. This may not be at all accurate. An individual may not have had experience and training in the past, or their disability may have hindered their learning process. As another example, if a vocational evaluator asks the question, "What vocational skills does the mentally retarded, deaf-blind, or multihandicapped severely visually impaired person have?", the answer is too frequently known before the vocational assessment begins: "few to none." Unfortunately, because an individual can perform few vocational tasks or has few vocationally related traits, some vocational evaluators assume the multihandicapped individual has little or no vocational potential and recommend no jobs, career or vocational training, or daily living skills training. Marc Gold (1975) and others, however, have used intensive instructional techniques to train severely retarded, multihandicapped persons to do tasks that few believed them capable of performing.

Using only a present performance approach, there is the danger of screening persons with special needs out of occupations that they might be able to do. When using this approach, several questions must be considered if the assessment is to be valid particularly with severely disabled persons. Among the questions included are

- could the person do the task with an adaptive tool or slight modification?
- does the person have the ability to learn the task or develop a particular skill?
- what type of training or behavior change techniques will facilitate learning?

This type of approach to assessment has been termed "a learning assessment." Efforts have been made to develop a learning assessement approach for the vocational assessment of disabled individuals (McCray, n.d.; Bellamy & Snyder, 1976). This approach, as it is currently conceptualized, focuses on answering such questions as "Can the individual learn?," "At what levels of difficulty can the individual learn?", "What types of instructional techniques are most appropriate for this individual?," and "At what rate does this individual learn?"

While little work has been done with visually impaired persons in the development of learning assessment approaches, some of the earliest work in the area (notably that of Gold, 1972), focused on teaching multihandicapped blind persons to perform complex assembly tasks. Gold, Horner, & Bellamy (1978) developed approaches in which intensive training was provided profoundly retarded individuals in vocationally related tasks. They found that these individuals, given appropriate teaching techniques with sufficient power, were able to perform tasks with a great deal more complexity than anyone thought possible. Gold reported training deaf-blind mentally retarded individuals to do a multistep bicycle brake assembly. Other researchers and program developers (e.g., Rusch and Mithaug, 1980) have developed similar programs to train mentally retarded individuals for placement in competitive employment. The fact that most of the individuals in these studies were found to have little vocational potential using assessment techniques which focused on present skill levels by either the task or trait approaches has important implications for the vocational evaluator. If after an extensive and expensive vocational evaluation process a vocational evaluator states that an individual cannot learn things that a subsequent training program teaches him to perform, then the vocational evaluation process used to assess multihandicapped blind people must be carefully re-examined.

McCray (1979) and Irvin and Halpern (1979) have adapted learning assessment approaches to vocational evaluation based on the work of Gold (1972). McCray described clinical procedures for using work samples to determine the learning style and ability of clients while concurrently assuring that evaluees adequately understand what they are to do before being assessed on their performance on a work sample. McCray suggests that a client perform part of a work sample up to a certain criteria level--for instance, three correct assemblies in a row--as a demonstration that he has an adequate understanding of the task. Once a client demonstrates this level of understanding, he or she then will be asked to perform the tasks of the work sample under standardized conditions. A vocational evaluator can use different teaching techniques to ensure that the client will learn to perform tasks required by the work sample.

Irvin & Halpern (1979) take McCray's procedures a step farther. Learning tasks are used which measure the client's response to the interaction of content, task difficulty, and teaching technique (see Figure 16). The Trainee Performance Sample (TPS) of Bellamy and Snyder (1976) attempts to predict the needed levels of training resources required by such individuals. According to Irvin and Halpern, the TPS can be used to:

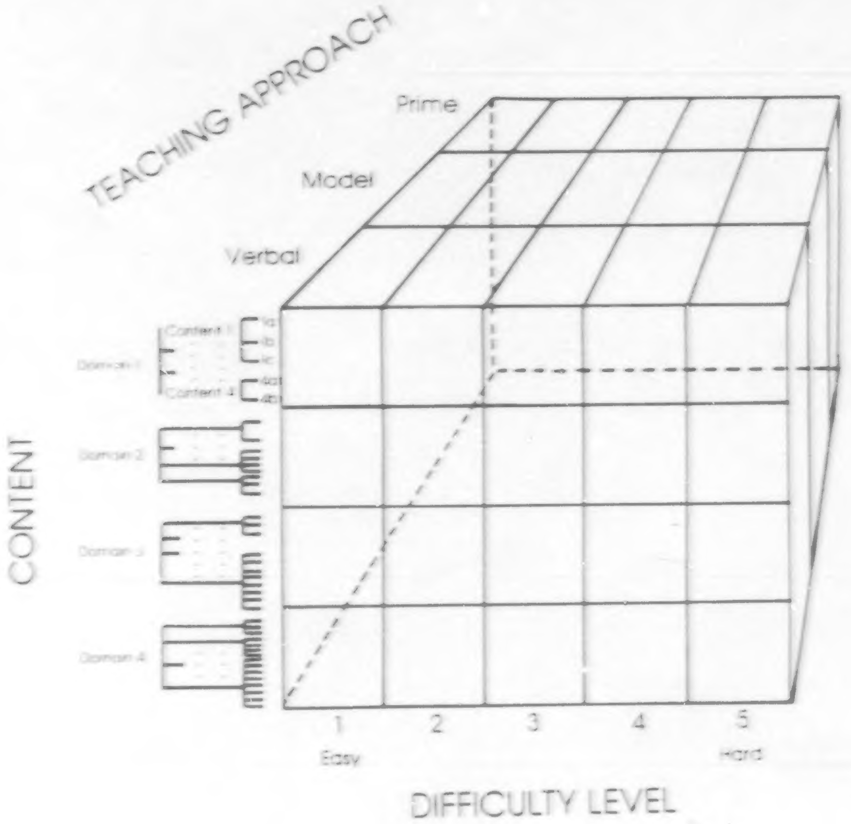
(1) recommend teaching/training techniques,

(2) identify needed staff resources, and

(3) indicate the difficulty level of tasks that can be learned by an individual given use of certain training techniques and time in training.

While these kinds of learning assessment procedures with work samples were developed primarily for use with mentally retarded people, there are important implications of the application of these concepts for vocational evaluators who work with visually impaired persons. As most vocational evaluators realize, separation of learning from present performance level is critical. Bauman (1976) and others have recognized the clinical use of assessment materials in analyzing the learning style, rate, and abilities of visually impaired people. While a considerable body of literature is available on the usefulness of the learning assessment approach with mentally retarded individuals (Bellamy et.al., 1979), there have been no research activities on the approach for vocational assessment of visually impaired people. Given the extensive work done in the development of educational techniques and

Figure 16. Measurement of client response to interaction of content, task difficulty, and teaching technique.


TEACHING APPROACH
Prime
Model
Verbal
CONTENT
Domain 1
Content 1
1a
1b
1c
Content 4
4a
4b
Domain 2
Domain 3
Domain 4
1
2
3
4
5
Easy
Hard
DIFFICULTY LEVEL

Irwin & Halpern, 1979

technology for teaching persons with visual impairments, this field is rich for future research efforts.

Job Modification Approach to Vocational Assessment

This approach is particularly important for blind and visually impaired persons. The basic thesis of this approach is: if a person cannot do a job or task, he/she may be able to do a task or job with an appropriate modification or adaptation. Modifications fall into several categories: (1) modification of the environment to make it more accessible to blind persons; (2) use of adaptive aids and devices ranging from "low tech" aids such as braille tabs to high tech aids such as speech synthesizers in microcomputers and calculators; and (3) modification of the method of performing the job. It is important that vocational evaluations have access to potential job modification aides so that work samples, on-the-job tryouts, and other assessment methods can be used clinically with modifications. The Job Development Laboratory (Mallik and Sablowski, 1973) has developed a procedure of client assessment, job development, job modification, and placement that provides a service model with high potential for use by rehabilitation and educational personnel with visually impaired persons.

Conclusion

Several approaches to vocational assessment have been reviewed. While these are theoretical approaches, they have significant impact on the day-to-day activities of professionals involved in vocational assessment. Care must be taken to use an appropriate mix of these approaches to provide a valid vocational assessment of visually disabled individuals. Additionally, as will be reviewed in the next chapter, care must be taken in the administration, scoring, and interpretation of tests, whether work samples or psychometric tests.

TEST ADMINISTRATION AND THE VISUALLY IMPAIRED POPULATION

When a vocational evaluation program for visually impaired people is developed, a vocational evaluation specialist first chooses the tests and other assessment tools to be used in the program. This is a complicated process. Tests for vocational evaluation must be selected with a clear view both of what information is needed and the characteristics of the individuals being tested. Specifically, an analysis should be made of jobs and training programs which are available locally. A determination must be made of the skills and characteristics needed to successfully perform jobs or to complete training programs, and tests and other assessment techniques should be selected to measure these skills and/or characteristics. The specialist must keep in mind that many suitable jobs and training programs may be available in a community, and even more importantly, that a vocational evaluation program needs to work with clients with wide ranges of ability levels and interests (Botterbush, 1980).

Once tests have been selected for a vocational assessment program, the vocational evaluation specialist must determine which tests should be administered to a particular client, if these tests need modification, and how necessary modification can be made. While some basic information is obtained from all individuals being assessed, it usually is necessary to ask some questions that are specific to an individual. For instance, if a newly blinded individual states he or she wishes to pursue training in the counseling field, specific assessment techniques must be used to determine whether or not the individual possesses the abilities and personality to obtain training and employment in the counseling field.

The unique guidance needs of the visually impaired person must be considered in the selection of tests to be given to a specific individual and in the determination of potential modifications in test administration. Botterbush (1980) provides some helpful guidelines. First, the degree of visual impairment must be considered. If an individual is visually impaired but is able to read the print of the test with or without low vision aids, no modifications or restrictions affect test selection beyond those for sighted persons. While indications of a client's visual functioning may be gained from medical reports, the most effective way to determine visual functioning is often simply to ask the client. If the client experiences discomfort and requires intense concentration to read the test, his or her test performance will probably be affected. In such cases, modification using large print tests, braille, and/or audio-cassettes must be considered.

Secondly, the general test-taking ability of the client must be considered. This includes a knowledge of the client's reading ability (either through print or braille) as well as his or her level of test anxiety and test-taking sophistication. If the reading ability of the client is not already known, a reading achievement test should be given early in the vocational evaluation process so that subsequent tests and assessment techniques may be appropriately selected. If a person cannot read despite an ability to see, he or she should not be given a test that requires reading unless that reading ability is a specific skill to be assessed.

Thirdly, the client's life history may affect the test selection process. The age of onset of visual impairment is a crucial consideration. If an individual has been blind since birth, understanding of visually-related test items will be limited, and the score may not reflect actual abilities. On the other hand, an adventitiously impaired individual may have functioned "visually to an age where he has already established concepts such as shape, color and visual aspects of the environment like clouds" (Bauman, 1973). Consequently, such concepts may be used in this testing situation. If a client is congenitally blind, an evaluator may either select tests that have fewer visually oriented items or may modify the test items so that they more accurately reflect the expected experiences of the individual. Caution, however, must be used in such a procedure, as this alters the standardization and norming process of the test instrument.

Visual impairments can cause difficulties in more than visually oriented concept formation. The cultural and life experiences of the visually impaired individual may be different from those of the sighted population (Vander Kolk, 1977). For example, overprotection by family and friends, exclusion from training, social interaction, schooling, and the lack of appropriate learning materials may all have depressed skill development. This does not cause great difficulty in terms of test selection if the testing objective is to determine present skill level. However, a problem exists if assessment is concerned with determining potential learning ability or personality. In this situation, tests should be selected that focus as closely as possible on the experiences of blind individuals (i.e., the Emotional Factors Inventory developed by Bauman) or tests with norms specific to blind and visually impaired individuals.

A final consideration in the selection of tests for visually impaired persons is the qualitative concept of "verbalism." Vander Kolk (1977) reports that a number of studies suggest that

> congenitally blind or early blinded individuals are able to learn words and concepts in a literal manner without understanding the concrete, functional meaning of the word (p. 159).

While there is controversy on how blind individuals learn concepts (e.g., Hans, 1974; Pavio & Okovita, 1971), the vocational evaluator should note, as Vander Kolk (1977) suggests, that the variability of intelligence scores often found among visually impaired persons may be due to:

> deprivation and reliance on nonvisual sense experiences by blind persons in their intellectual development and reliance on auditory, tactual cues to compensate (p. 160).

Orientation and Preparation for Assessment

General client orientation to the vocational evaluation process has been discussed previously (Chapter 3). However, a visually impaired individual must also be oriented to each specific test or assessment tool used in the vocational assessment process. Orientation guidelines to the general testing environment apply as well. Once in the testing location, the client should be given an orientation to the tests and testing materials. This may include:

1. physical orientation,
2. an explanation of the test content and purpose, and
3. other evaluator comments and procedures designed to relieve test anxiety and insure valid assessment.

In terms of physical orientation to either psychological or performance tests such as dexterity tests or work samples, the partially sighted client may need no or minimal special assistance. For the totally blind individual, however, special assistance must be given. Bauman (1976) points out that although sighted people become familiar with work samples or dexterity tests very quickly merely by looking at them, the blind person must have the opportunity to handle the materials, and he needs to be given enough time to become familiar with them. The evaluator should identify in advance the information needed verbally and tactually by the client. Bauman (1976) indicates that the blind client needs to be informed of all the data the visually unimpaired individual would derive from sight. Unless the test is directed toward ascertaining the level of the client's tactile abilities, the psychologist should describe the tests as the client examines them. If the client seems uncertain, the psychologist may guide the client's hands while emphasizing those aspects of the test pertinent to efficient performance.

Similar procedures may be used with work samples. According to Dickson (1976), the evaluator should

> give the directions verbally, after first describing the layout of the sample and the tools used. The evaluator should guide the client's hands over the parts as they are mentioned. Then the client should be allowed to go over them at least once more, handling the parts and answering questions. If he requires more time, the evaluator should indicate that there is no hurry and that he will be available to answer any questions or provide further explanations (p. 17).

Dickson (1976) indicates that the evaluator may guide the hands of the visually impaired person in completing a practice task as necessary. Additionally, the provision of a model of a completed product or several models of a product in various stages of completion may be used. Models may give the client a concrete example to which he or she can refer.

Special care must be taken in the physical orientation and instructions of the client in the assessment situation. Otherwise, an assessment technique may be assessing the client's ability to learn rather than be a valid assessment of the skill in question (Scholl & Schnur, 1976). If good orientation is given, the probability of results of each test being incorporated into the client's own decision-making process is high, which may increase motivation since people seem to be more interested in participating in activities they understand and see as important to them. Language should be used which the visually impaired client understands and which is accurate while minimizing threat and anxiety. For example, one would not say about an intelligence test: "This test will tell us how smart you are!" Rather something like the following might be said:

> This test is to help you plan what training and jobs you may go into and do well. You can't pass or fail; but do your best, so you and I can tell which job is best for you.

For work samples and other assessment techniques that are related to specific occupational areas, an explanation should be given concerning this relationship and further information should be given concerning employment in occupations related to the work samples. It would be most useful to indicate some of the modifications and adaptations used by visually impaired persons in performing such occupations. Likewise, if modifications are used in the work sample, these should be explained to the client as well as the rationale of their use. This process aids the client to use the assessment experience and test results to make his/her own vocational decisions and to increase understanding of his/her abilities as they relate to the real demands of the world of work.

Administration Procedures

In administering tests and work samples to visually impaired indi-vididuals careful consideration must be given to the manner in which instructions and test items are presented and the manner in which the individual will record responses to test items. Other administrative concerns relate to the procedures designed to maximize the valid assessment of the characteristics of the client.

Presentation of Instructions and Test Items

For clients with residual vision, large print tests and/or low vision aids may be useful in presenting test instructions and items. In using large print tests, all client instructions and test items must be printed in large type in an easy-to-read format. Tests may be modified locally by using an "Orator" ball on an IBM Selectric typewriter which produces letters around 3/8" high. Additionally, some high quality photocopy machines are available that can enlarge existing copy. However the test is enlarged, additional copies should be duplicated, preferably with an offset printing press to ensure high quality reproductions (Botterbush, 1980).

The American Printing House for the Blind makes available the following large print tests:

1. California Achievement Test (Form B, Level 3; Form A, Level 4).
2. Cooperative English Tests (Form 1A).
3. Cooperative Mathematics Tests (Form A).
4. Cooperative Primary Tests (Form 2BB).
5. Cooperative School and College Ability Tests (Form 2A - 4A).
6. Cooperative Sequential Tests of Education Progress (Forms 2B - 4B).
7. Gates-MacGinitie Reading Tests (Form 1, Primary A, B, and C. Form 1M, Surveys D and E; Form 3M, Survey E).
8. High School Equivalency Diploma Tests.
9. Iowa Tests of Basic Skills (Form 3, Levels E and F. Form 4).
10. Kuhlman-Anderson Test (Booklet B).
11. Stanford Achievement Tests (Forms A and B; Primary, Intermediate,

and Advanced Batteries, Academic Skills).

12. Wide Range Achievement Test.

Unfortunately vocational aptitude and interest tests currently are not available.

For totally blind individuals or for the partially sighted who can not use residual vision well enough for a particular test, audiocassette tapes, braille, oral presentation, physical guidance, or a combination of these techniques may be used. Special forms of braille tests may be ordered from the American Printing House for the Blind. As with large print tests, those available are mostly academic achievement tests. The time period for braille tests must be extended because most visually impaired people read braille only about one-third as fast as a sighted person reads print. The utility of braille tests is limited, however, because only a small percentage of visually impaired persons are able to read braille. The following tests are available in braille from the American Printing House for the Blind (Botterbush, 1980).

1. Cooperative School and College Ability Test (Forms 2A - 5A).
2. Cooperative Sequential Tests of Educational Progress (Forms 2B - 4B).
3. Diagnostic Reading Tests (Form A: Survey Sections for Lower and Upper Levels).
4. Iowa Test of Basic Skills (Form 3).
5. Stanford Achievement Tests (Forms A and B: Primary, Intermediate, and Advanced Batteries. Form B Academic Skills).

The most common method of presenting test instructions and items to this population is oral. This may be done with a tape recorder or by having the examiner read the test items. When the examiner reads the test, special care must be taken to pronounce words clearly and correctly. Additionally, slight modifications of the instructions may be necessary if the examinee is using an alternate method for recording answers.

Utilization of a tape recorder provides for consistency in administration and saves time for the evaluator. If a recording is used, however, the evaluator must be available to answer questions that the client may have and ensure that the client understands how to use the tape recorder and that good quality recordings are used.

Several problems exist with oral presentation of test material. Often the evaluee will need to remember information that sighted persons can simply read again as necessary. For instance, in using multiple-choice test items, the client will have to keep all items in his or her mind. This is often difficult to do and may produce scores which do not adequately reflect the real skills or characteristics of the client. Listening to test instructions and items read at a set pace may be boring for some clients, particularly on a long test. Also, if a test with time limits is read, the evaluator is changing conditions under which the test was normed. Despite these problems, however, oral presentation of assessment materials remains the most used testing administration method when dealing with totally blind individuals.

Selection of one of the preceding administration methods should be based on the following principles.

1. Administration techniques should be as similar as possible to the original conditions under which a test was standardized.

2. Administration techniques must ensure adequate understanding and valid skill assessment of the client.

When using work samples which assess client abilities on tasks associated with a particular occupational cluster, an additional principle is important:

3. Instructional and administration techniques should be most like those used on the job or in a training program.

Adherence to these principles will result in a more realistic vocational evaluation process. Of course, alterations may be required. The alterations must be born in mind when recommending vocational placement and suggesting modifications in the vocational training process.

Recording of Responses to Test Items

Not only must special care be taken to ensure valid client understanding of instructions and test items, but procedures must be implemented to allow the client an effective means of indicating responses to test items. Partially sighted individuals may be able to use standard answer sheets without modification with or without the use of low vision aids. Some clients may also use large print tests and simply circle correct answers themselves. If this is done, the client's responses can be transferred to a standardized answer sheet to facilitate scoring. Additionally, multiple choice, multiple purpose answer sheets are available from the American Printing House for the Blind in both braille and large print. Use of such answer sheets allows as close an adherence to the original standardization conditions as possible.

The visually impaired client may also indicate responses orally either to an examiner or into a tape recorder. When an examiner records verbal responses, two problems are present. Only one evaluee can be tested at a time, and the client is not allowed the privacy given the sighted person. The use of a tape recorder may help solve these difficulties but may also create other problems. When using a tape recorder to record responses, two recorders may be needed--one to administer instructions and test items and one to use to record test responses. This procedure is most effective when narrative responses are needed by the client (as in a verbal projective test or a narrative examination). When multiple choice or true-false formats are used, an administration audio tape must either allow sufficient time for responses, or the client will need to turn the administration recorder on and off as he responds to test items.

Another method of recording responses involves using a typewriter or a braille stylus to record answers. If braille is used, a staff person must, of course, have skills to read the responses. With multiple choice questions, a client may type or write only the first letter or two of the answers. This prevents the client from having to remember (a) all answers, and (b) the number or letter with which each answer is associated; it also reduces response time. Bauman and Hayes (1951) described some problems that may occur and made suggestions for solutions:

> The blind client who is comfortable with typing or braille may use either to indicate his response. In group testing it is, however, important to keep in mind that the sound of the number of strokes, types, or the number of punches made by the braille stylus can betray the responses of one client to another. Thus, a slow or dull person can easily

> take advantage of the quicker responses of another client to obtain the correct answers. This is particularly easy with true-false items. In typing, the difficulty may be avoided by having the client type only one letter--"T" for "true" and "F" for "false." In braille writing, a solution is found in the use of "C" for "correct" and "I" for "incorrect" (each giving two clicks), to which may be added an "E" for "either," if provision is to be made for a doubtful response (p.10).

Bauman suggests another procedure useful when responses are multiple choice or true-false. Tickets with item numbers on them are given to the client who then places them in a "true" or "false" pile. If used with multiple choice questions, piles may be made for each possible response. As a double check for accuracy, a hole can be punched on each tenth card; the client can be instructed to ensure that the ticket number and item number match--or to call the evaluator who may check this procedure.

Procedures to Help Assure Valid Assessment

Several miscellaneous, but important, procedures have ben used by evaluators and clinicians to help ensure valid assessment of visually impaired persons. Each has been designed to overcome an assessment difficulty usually related to adapting assessment devices designed for the sighted.

Several related procedures attempt to compensate for the fact that tactile orientation takes more time than with sighted clients, and visually impaired persons may be assessed inadequately without proper instruction and demonstration. Consequently, Bauman (1976) has suggested teaching the client to do a particular task prior to assessing his or her actual performance on the task using standardized techniques. Some professionals have advocated teaching a task up to a certain demonstrated level of performance, as for example, two correct assemblies out of two within ten minutes (McCray, 1978). Other practitioners allow a set amount of instruction and practice prior to administration of the test under standardized conditions (Bauman, 1968). This technique is closely related to the procedure of giving the client extra trials before performance is finally assessed. Bauman (1968), for instance, suggests that totally blind clients be administered the Minnesota Rate of Manipulation Test twice--the first as a practice try. Bauman (1975) cites that Yoder indicated that the procedure he uses with work samples is to

> give the individual an allotted time under instruction, followed by a trial run, again for a specified period of time, after which he works against the stop watch and the standards for the job (p. 43).

A useful procedure to ensure client understanding of instructions is to have the individual repeat instructions and, perhaps, simply demonstrate an understanding of what is to be done.

Another technique to ensure valid assessment involves the actual modification of the content of a test or work sample. For tests with items that have visual associations which a client may not understand, the vocational evaluator may change the items to words more in keeping with the client's experience. Additionally, in a work sample, content may be changed if the evaluator wishes to use adapted materials that the visually impaired person would use on the job. Such procedures must be used with caution and with the recognition that standardization procedures are being violated and that, consequently, norms and scoring procedures will be affected.

Another technique is the allowance of more time to complete the test. This, of course, is a consideration only on tests with set time limits or where timing is included as part of a score. If more time is allowed, the evaluator must use his own professional judgement in interpreting results. While additional time may be necessary to equalize disadvantages possessed by the blind person in taking a test, there is no precise way to estimate the amount of extra time that can be allowed, and existing norms must be used. Despite these problems, however, practitioners have felt that changing a speed test to a power test does give them useful information about client skills.

Finally, a learning assessment procedure for use with achievement tests has been suggested using the following steps: (1) administer and score the test in a normal standardized manner; (2) analyze and identify missed items; (3) teach these items and concepts to the client and make observations concerning the client's learning ability. For instance, if a student did poorly on a math test and quickly gained the concepts with additional help, one might make a recommendations for entrance into a vocational training program requiring a concurrent remedial math class.

6

WORK SAMPLES AND THE VISUALLY IMPAIRED CLIENT: AN INTRODUCTION:

Rehabilitation vocational evaluation relies heavily on the utilization of work samples in the assessment of work capabilities for visually impaired persons. This chapter provides: (1) an overview of information concerning work samples and (2) a review and discussion of various resources concerning work samples with visually impaired people.

What are Work Samples?

According to the Vocational Evaluation and Work Adjustment Association (VEWAA, n.d.), a work sample is a

> well defined work activity involving tasks, materials, and tools which are similar or identical to those in an actual job or cluster of jobs. It is used to assess an individual's vocational aptitude, worker characteristics, and vocational interests (p. 92).

Sitlington (1979) defines a work sample as a "simulated representation of work tasks which may or may not represent an actual job or a component of a job."

The essential element of a work sample is the involvement of the client in work--in this case simulated work--as a means of assessing his or her traits and possibly his or her ability to perform the actual tasks of a job. Work samples literally involve a "sample of work." Other characteristics of work samples as they have been developed and used in the field include the following:

1. Work samples are performance tests. Consequently, the questions of scoring procedures, standardization, reliability, and validity must be addressed.
2. Work samples usually do not exceed two to three hours in administration time.

Work samples may also be placed on a continuum relevant to the following variables.

1. Aptitude-achievement. Work samples may assess a person's potential to enter training and to learn to do a job or the degree to which an individual can already perform the tasks of a job. The former tends to a trait approach while the latter uses a task approach.
2. Present skills--learning capacity and style. Similarly, a work sample may be used to assess the present skills an individual possesses or to assess the abilities of the individual to learn job tasks and to identify the most effective method by which he learns.
3. Standardized--informal. Some work samples have very specific, standardized, formal administration, scoring, and interpretation procedures. This tendency toward formality has been increasing as the field of vocational evaluation has developed. However, work samples may also be informal observations of an

individual's performance on a work task. Such informal work samples have also been called "performance samples."

4. *Norm referenced--criterion referenced.* The scoring and interpretation of work samples may be norm referenced when an individual's performance is compared with other relevant norm groups, including industrial norms (McCray, 1979). A work sample may also be criterion-referenced where the individual is compared against a standard. At its simplest level, criterion-referencing may simply indicate whether or not an individual can perform a task. At a more sophisticated level, an industrial standard may be set using industrial engineering procedures.

A middle course has been described as a "direct evaluation procedure" in which an individual performs a work task, and his performance is evaluated in a criterion-referenced manner. This evaluation is consequently converted into ratings for a Qualifications Profile of Worker Characteristics as defined by the Department of Labor. Project Discovery (Moore, 1981) uses this approach as have Field & Field (1981).

Work Samples and Visually Impaired Persons

Work samples used with the visually impaired clients in rehabilitation facilities and state schools appear to focus primarily on learning assessment and trait assessment using trait-oriented commercial work sample systems such as VALPAR and JEVS, and criterion-referenced work tasks developed by local rehabilitation facilities (Peterson, 1982). In rehabilitation facilities associated with sheltered industries, many work samples (described later in this chapter) are used that have been taken directly from the work stations in the plant. Two commercial work sample systems, VALPAR and McCarron-Dial, have developed specific modifications for the visually impaired. Other commercial systems in which modifications have been made are used by rehabilitation facilities. These local modifications include ones made to the Singer and JEVS system. Other commercial vocational evaluation systems have potential for use with visually impaired persons despite their less frequent use. A review of some of these follows.

Types of Work Samples

Work samples may be categorized according to several variables. However, one of the most useful categorization schemes is based on the degree to which the work samples emphasize trait assessment versus the ability to perform the tasks of specific jobs or groups of jobs. VEWAA (1975) and Pruitt et al., (1977) have identified four types of work samples. They are

(1). actual job samples,

(2). simulated job samples,

(3). single trait samples, and

(4). cluster trait samples.

Related concepts include various situational assessment procedures performance samples (Albright, 1980), job simulations, and training samples

(Thomas, 1982).

For the purpose of this monograph, however, it appears most useful to think of work samples as trait or task-oriented. *Trait oriented work samples* are those which focus on the measurement of traits. While actual work tasks are used, these work samples are not developed to determine whether an individual can, for example, put pipes together (one task involved in the job of a plumber). Rather, trait-oriented samples may use such a task to determine the traits or characteristics that an individual possesses such as eye-hand coordination or spatial perception. Trait-oriented work samples may be further identified as single trait work samples or cluster trait work samples. *Single trait samples* are used to assess one trait only. An example is the eye-hand coordination work sample of the HESTER system. *Cluster trait samples* assess a group of worker traits which are related to a job or cluster of jobs. The Micro-TOWER, JEVS, and VITAS are examples of systems using this approach.

Task-oriented work samples have a primary focus on the assessment of abilities to perform specific tasks of a job. For example, a task-oriented plumbing work sample might determine whether a visually impaired individual can change washers in a sink, cut and thread pipe, and clean a clogged drain.

Task-oriented work samples include two types. These two types are job samples and occupational cluster work samples. *Job samples* are replicated in their entirety directly from industry and include the equipment tools, raw materials, procedures, and work standards of a job. The commercial work sample system that most closely resembles a job sample is the TOWER. *Occupational cluster work samples* replicate some of the most common tasks associated with a cluster of related jobs.

While traits such as coordination and frustration tolerance can be assessed using task oriented work samples, their primary focus is on the ability of an individual to do the tasks of the job. It should be noted that in task-oriented work samples, traits may also be assessed. The opposite, however, is not true: you cannot assess ability to do tasks with trait oriented work samples. For instance, it is possible to possess the general traits of an auto mechanic--at least as defined in the *DOT*--and not be able to set the gap on a spark plug.

Related Assessment Techniques

A number of related assessment techniques are used that provide assessment using the tools, tasks, and materials of the work place. These include (1) performance samples (2) job simulations and assessment centers and (3) job tryouts. Vocational classroom tryouts and job tryouts are similar. The former is used most often when the objective is placement in a vocational training program and the latter when direct job placement is the goal. Both involve placement for a "tryout" period in which the individual is involved in vocational tasks and observed by a supervisor or vocational teacher. Performance samples are informal work samples used in a vocational class to gain some insight on the performance and learning skills of the client. Job simulations are types of work samples used in business and industry for training or assessment purposes. They simulate conditions of the job and are used in assessment centers in business to select individuals for positions or to assess needs for additional training.

Guidelines for Selection

Vocational personnel who are developing a comprehensive vocational evaluation and counseling program for visually impaired people must carefully select and develop evaluation materials. This is particularly true with work samples. Some basic guidelines are needed for selecting the general types of work samples and occupational categories for work samples and for evaluating the effectiveness of a work sample.

The following principles may assist the vocational evaluator in the selection and use of work samples.

1. Work samples should relate to the employment opportunities in the local labor market.
2. Work samples should take into account the needs and characteristics of the visually impaired individual.
3. Work samples in a comprehensive vocational evaluation program should provide an opportunity for exploration of occupations in a wide variety of fields on various levels of sophistication.
4. Work samples should be available to assess an individual's characteristics for both occupational training and job placement.
5. Work samples should be available that provide both task and trait-oriented vocational assessment.
6. Work samples should be available to assess learning styles

which can be used to recommend teaching techniques.

7. Work samples should employ systematic procedures for determining appropriate job modifications.
8. Work samples should be systematically constructed upon accepted techniques of test development.
9. Work samples should systematically compare the abilities of an individual with the actual requirements of jobs or training programs.

While it is almost impossible for any one work sample to meet all of these criteria, this list should assist in the selection and development of work samples for a vocational evaluation program for the visually impaired population. Some of these principles are discussed briefly below.

Relevance of Work Samples

Vocational evaluation and work sample development should be based upon a comprehensive analysis of both employment and training available in the local labor market. A vocational evaluator must define the "local" labor market. Does one look at a city, county, a state, a region? All of these, of course, but the primary focus should be on the general area in which the majority of clients are willing to work. For example, if you are a vocational evaluator at a vocational-technical school which provides training in technical areas, and the school's graduates move into jobs throughout your state, the "local" labor market would be the entire state. However, if you are employed in a rural area and few clients are willing to move more than 20 miles to go to work, the "local" labor market will be much more restricted. The work samples selected, therefore, should be representative of the jobs available in the local area as defined by the geographic mobility of your visually impaired clients.

Several sources are available for gathering information about local labor market conditions. The following list, while not inclusive, provides a starting point for a vocational evaluation.

(1) Business and industry guides are normally available from the local Chamber of Commerce.

(2) Reports that give data on jobs open and filled in various categories in local regional areas are available from state employment services. This information is usually compiled on a yearly basis with employment projections calculated.

(3) The Annual Plan of state departments of vocational education provides a compendium of employment data for a state.

(4) Local information is also available through want ads of newspapers and telephone company "yellow pages."

(5) Documents entitled County Business Patterns are published annually for each state by the U.S. Department of Commerce. Their documents contain detailed industry reports on employment (including payroll, number of employees, and size of establishments) for each county.

These sources, of course, will provide only very general information, but they should give the vocational evaluator enough information to determine the general areas in which work samples are needed. Job analyses and review of job descriptions will assist the evaluator to determine more specific job requirements from which work samples may be developed.

A vocational evaluator must also gather information concerning local training opportunities for visually impaired people. This is probably the most neglected step in vocational evaluation, but it is a critical one if the career development of the visually impaired person is to be enhanced. Vocational training may include:

1. university or college level programs,
2. community colleges,
3. vocational-technical centers,
4. secondary vocational programs,
5. sponsored vocational trainings through the Job Training Partnership Act,
6. rehabilitation facilities, and/or
7. private proprietary vocational training schools.

Information concerning these options is available from a number of sources The annual plans of state departments of vocational education should contain detailed information on state supported vocational training available. Brochures and catalogs from various institutions may also be helpful.

While this information will give general data concerning training opportunities, it will give only limited information concerning specific skills needed to succeed in training. In many cases, training and job analyses should be conducted (as described in Chapter 2) to determine this necessary specific information. Again, identification of training areas will help in determining the work samples to be used in the vocational evaluation process.

A final point should be noted. Rehabilitation agencies have tended to use work samples primarily for unskilled, semi-skilled, and skilled jobs. Selection of clients to enter in professional and technical training has relied almost totally on traditional psychometric instruments. Work samples for technical and professional assessment can be very useful, as assessment centers in business and industry are demonstrating, in assessment for higher level jobs and may do much to facilitate appropriate vocational choices.

Needs and Characteristics

Work samples must be developed and selected which focus on jobs and training open to the visually impaired population and which provide for administrative procedures which do not penalize this population. Work samples should be available which permit assessment for several levels of jobs. It is easy to limit the career development or potential of a visually impaired person because of the deficits in the instruments used to assess them or because work samples are not available which assess a wide variety of jobs. Research reports and occupational information which focus on training and employment in which visually impaired individuals have been successful are key aids in selecting work samples. If blind persons are reported as achieving in a variety of fields, but work samples are available for relatively few fields, the lack of congruence between employment and assessment can restrict the career development of visually impaired persons.

Vocational Exploration

A comprehensive vocational assessment program will provide a variety of work samples in different occupational fields and at different levels which are based on occupations in the local area employment market. A program of vocational evaluation needs to be developed which includes a systematic plan to expand its comprehensiveness to include a significant number of different occupations at different levels of performance, i.e, unskilled to professional.

Roe's fields-by-levels method of organizing occupational information (1956) provides one way to accomplish this planning (see Figure 17). In this scheme different occupational fields are identified. Within each field, jobs are placed on a continuum ranging from professional/managerial through technical, skilled, semi-skilled, and unskilled. In doing a local labor market analysis, a vocational evaluator can identify job categories on this matrix. Work samples may be selected that will represent different occupational areas available locally at these different levels. Such a procedure produces a systematic method to ensure a locally based, client-centered, comprehensive vocational evaluation program. It should be noted that this same concept may be used with other methods of occupational grouping such as the 14 career clusters approach used by the Department of Education.

Figure 17. Field-by-levels organization of occupational information.

	Service	Business	Organization	Technology	Outdoor	Science	General Cultural	Arts and Entertainment
Professional								
Technical								
Skilled								
Semi-skilled								
Unskilled								

(Adapted from Roe, 1956, p. 51)

7

DEVELOPING AND MODIFYING LOCAL WORK SAMPLES FOR USE WITH CLIENTS WITH VISUAL IMPAIRMENTS

Professionals in vocational evaluation have long advocated the development of local work samples based upon the needs of client populations and analysis of local employment opportunities. In this chapter, guidelines are presented for the systematic development and/or modification of a work sample. The directions given, it should be noted, are most applicable to task-oriented work samples- job samples or occupational cluster work samples. The guidelines given for the development of work samples are also useful in modifying an existing commercial work sample, or materials from another source. The guidelines are presented in terms of step-by-step procedures for developing a work sample.

Procedures

The initial development and use of work samples in rehabilitation facilities has often been implemented simply by assembling materials for a work task and observing a client's ability to do that task. As vocational evaluation procedures have developed, the field has become aware that work samples are tests that need to be systematically developed. This awareness has led to increased sophistication in work sample development efforts. Commercial work samples systems have been one result of this sophistication. However, there is no reason why a skilled vocational evaluator cannot systematically develop or modify his or her own work samples for visually impaired persons. The process that is described below is intended to serve as a guide.

1. Decide which work samples to develop.

   This is the obvious first step. This decision should be based upon an analysis of the client population and the local labor market. (Additional details concerning this step are provided in Chapter 6.)

2. Develop an ad hoc advisory committee.

   This is an excellent way to assure the usefulness and validity of work samples. Additional benefits might include participation of other staff, consumers, and representatives of business in developing an understanding of the vocational assessment process, and building relationships with consumers and employers which may facilitate the placement of blind and visually impaired persons. The membership of the advisory committee should include

   a. specialists who intimately understand the requirements of the jobs or training areas, i.e., employees, supervisors, and vocational teachers;

   b. staff who understand the needs of the client population; and

   c. visually impaired consumers.

   This advisory committee can: (1) review the job analysis, (2) validate the content of the work sample, (3) suggest appropriate industrial or business standards, (4) develop scoring procedures, and (5) provide job tryout stations subsequent to work sample assessment. If a vocational evaluation program intends to develop work samples in several clusters of jobs, an advisory committee can be used for each cluster.

3. Conduct a job or training analysis.

Work samples can be developed to provide recommendations for job placement or recommend actions for entrance into training or both. When developing a work sample for vocational training programs, a training analysis should be conducted. This analysis should determine precise entrance criteria, success behaviors, and a teaching format with potential modifications for the visually impaired student. If assessment is intended to provide recommendations for job placement, a job analysis should be performed. A detailed and accurate analysis must be conducted that includes a determination of job tasks, worker requirements, physical demands, visual demands, and environmental conditions. (More detailed information concerning this process is available in Chapter 2.)

4. Identify tasks that are to be done in the work sample.

Identification of appropriate tasks to do in the work samples is a key task which will determine the usefulness of the work samples whatever the type of work sample involved. This is a crucial and complex task.

a. Based upon job analysis and other information, the vocational evaluator must determine the most critical or important tasks to be done on the job. These tasks must be structured so that they can be performed in a work sample in a maximum of two hours. The evaluator must review the job analysis and identify the most important tasks, taking into account both frequency of task performance and importance. Then, he or she lists the tasks to be done in the work sample in the order that they should be accomplished including estimates of the average time and range of time required to do each task (see Figure 18). Tasks should be identified which range from simple to complex, are complete but time effective, and are as realistic as possible, i.e, as much like the job or training program as is practical.

Alteration of the actual tasks of the job for the visually impaired should be avoided. If this is done, it should be noted since alteration assumes job restructuring by the employer. The work sample may be set up where the tasks of the job are completed or sequenced in a different way than usual. This too should be noted. Systematic procedures for the use of various modifications should be identified and adaptive procedures or equipment detailed.

b. The task list will probably need to be revised several times. Once it has been completed, ideas about

Figure 18. Suggested form for listing of tasks in work sample.

TASK	TIME ESTIMATE	NOTES

materials and equipment required to do the tasks as outlined must be noted. Specially adapted materials and tools (e.g., raised line rulers for the visually impaired worker) needed to be identified and their use noted. If material requirements are not feasible, the way the tasks are to be implemented may need to be revised. Realism must be balanced against cost in the design of the work sample.

c. The advisory committee should review the task list. The list should be revised, if necessary, based on feedback from the advisory committee. This procedure should ensure that the work sample has content validity. It will also assist in development of the administration of the work sample.

d. Step-by-step procedures should be written describing in detail the procedure to be followed by the visually impaired person taking the work sample.

5. Design and put together the actual work sample materials. After the tasks to be done and materials needed to complete the tasks have been identified, plans and diagrams showing the layout of the work sample and list of the materials needed should be completed. The work sample should be built according to the plan and from the listed materials. Some minor modifications may need to be made in the set-up and materials as the work sample is actually constructed.

6. Develop administration procedures.

To develop the detailed instructions for administration of the work sample, the purpose of the work sample must be determined. Is it designed to assess present skills for job placement or entrance into a vocational program, assess learning ability and style, or both? If both, this makes the work sample more comprehensive and useful. In these cases, the administrative procedures will consist of four sections including client orientation, practice/learning period (or instruction and demonstration), performance period, and client feedback. Following is a suggested format for outlining these sections (see Figure 19).

d. Feedback interview:

During the client orientation period, the evaluator should tell and/or show the client what he or she will do and how the work sample relates to acutal jobs. Procedures for maximizing client understanding and motivation are important here. This may be a very simple discussion or may include more extensive use of written or audio-visual vocational information materials. The practice/learning period ensures that the client understands directions and provides the evaluator with information about his learning style and abilities. Learning assessement occurs in this period since the client is taught and practices the task. Administration methods should be developed

Figure 19. Suggested form for recording administrative procedures in the work sample to measure learning ability and learning style.

a. Client Orientation:

Evaluator Task/Statement	Drawing/Picture	Client Task

b. Practice/learning Period:

Evaluator Task/Statement	Drawing/Picture	Client Task

c. Performance Period:

Evaluator Task/Statement	Drawing/Picture	Client Task

d. Client Feedback

Evaluator Task/Statement	Drawing/Picture	Client Task

to meet the needs of visually impaired persons. A systematic procedure should be developed to record responses to various teaching techniques. Experimentation with job modification will most easily occur here. During the production period, the client demonstrates his skills to do the job. The client's quality and speed are usually measured by the evaluator during this period of assessment.

In a feedback interview, the evaluator and client discuss how the client did on the work sample and how he responded to the tasks of the work sample. There are two formats for the administration of work samples:

a. Set up the orientation and the practice/learning periods for the entire work sample at the beginning of the process. Then ask the client to complete all tasks of the work sample (Practice--Performance).

b. Alternate between short instruction/practice sessions and performance:
Practice--Performance (Task 1).
Practice--Performance (Task 2).

The vocational evaluator must also determine how much assistance to provide during the performance period. Evaluator assistance can range from none to helping the client correct mistakes in mid-course of the work sample administration.

The administrative order listed above--orientation, practice/learning, performance, and feedback--allows the visually impaired client to practice new material before performing it, thus separating learning from performance. However, in some cases, this may unnecessarily lengthen the work sample and provide inadequate information about the client's performance prior to instruction. Consequently, the following order--orientation/instruction, performance, learning, performance, and feedback--may be more useful with some work samples. Using this order, a client is assessed and a determination is made of those tasks performed adequately and those tasks performed inadequately. The client is subsequently given instructions on those tasks performed poorly and is allowed a period of practice followed by re-testing on that part of the work sample. This procedure allows assessment of present skills while also providing an evaluation of client learning ability and style. Such a procedure appears most effective for work samples that are related to more complex skills.

7. Develop scoring procedures.

For scoring, it must be decided whether to use a criterion-referenced or a norm-referenced approach or both. In a criterion-referenced approach, the visually impaired person's performance is compared with the performances of sighted persons. Utilization of both approaches is suggested for visually impaired persons.

8. Field test the work sample.

After the previous steps have been completed, the work sample must be tried out. This is a vital process in improving the work sample and making it a more effective vocational evaluation tool.

9. Develop norms, reliability, and validity.

A plan for collecting norms and establishing data to develop reliability and validity of the work sample must be developed though the procedures described to ensure content validity. Botterbusch (1981) has written a useful guide to assist vocational evaluators to establish the reliability, validity, and norms of work samples.

10. Complete work sample manual.

The work sample manual should now be complete. At this point, all parts of the manual have been developed. The task remaining is to assemble and edit the manual. The work sample can be used as a tool for the vocational evaluation of blind and visually impaired individuals.

Work Sample Manual Development

If the steps described above are implemented, the work sample manual will be developed in a systematic fashion. The final document should clearly describe the purpose of the work sample, its uses, its administration, its scoring procedures, technical considerations, materials, and hardware. If a work sample is to be used with both visually impaired and sighted persons, adaptations for the visually impaired populations can be detailed in the manual. The Materials Development Center (University of Wisconsin-Stout) recommends that a specific format for a work sample manual be issued in the field. See Appendix A for further publications discussing the work sample manual format and resources available to aid in the use of work sample manuals for use with visually impaired persons.

8

WORK SAMPLES DEVELOPED BY LOCAL REHABILITATION FACILITIES

Vocational evaluators working with visually impaired people have relied extensively on the use of locally developed work samples. Often these work samples have been based upon contract work available in sheltered workshops employing or training visually impaired individuals. In a survey of facilities and schools serving the visually impaired population (Peterson, 1982), several vocational evaluators employed in rehabilitation facilities sent information about locally developed work samples used in their programs. (Information about locally developed work samples can usually be obtained at cost by contacting the particular facility.) It should be noted that many vocational evaluators working with visually impaired people are using some of the work sample materials developed by the National Industries for the Blind (NIB).

National Industries for the Blind (NIB)

NIB has developed a series of evaluation tasks which have been distributed to NIB work shops throughout the nation. Additionally, several electromechanical work samples have been produced. Development of norms for these work samples is a joint project of NIB and the

Rehabilitation Research and Training Center on Blindness and Low Vision, Mississippi State University. Copies of these manuals can be obtained by writing for information to:

Rehabilitation Research and Training Center
in Blindness and Low Vision
P. O. Drawer 5365
Mississippi State, MS 39762

A number of evaluation tasks are available from Royal Maid Association for the Blind (P. O. Drawer 30, Hazlehurst, MS 39083). These tasks primarily involve the use of manipulation skills to sort, package, assemble, and disassemble various objects, and to perform drilling, cutting, sanding and other operations with power tools. The evaluation tasks are related to the types of contract work customarily found in the protected employment for blind workers. Each evaluation task is designed to assess various work abilities which relate primarily to skills needed in these sheltered industries. However, these work abilities may also be important in competitive employment situations.

As illustrated in Figure 20, the documentation for each evaluation task is divided into the following sections:

1. objective--a description of the work abilities assessed in the work sample,
2. tools and materials,
3. introduction (guidelines for the vocational evaluator in setting up the materials),
4. presentation (general administration instructions that include information on orientation and actual administration), and
5. work assessment (guidelines for the kinds of observations to be

Figure 20. Documentation of evaluation tasks.

EVALUATION TASK #20
COMPETITIVE PRODUCTION RATE 1040 PER 50 MINUTES

TASK: DOWEL CUTTING - BAND SAW

I. OBJECTIVE

To evaluate and/or provide work adjustment in the following work abilities:

(1) Standing tolerance
(2) Material control
(3) Safety awareness

II. TOOLS AND MATERIALS

(1) Band saw
(2) Miter guide
(3) Material stop and clamp for determining length
(4) Supply of 3/4" dowels ten inches in length

III. INTRODUCTION

(1) Place miter guide in band saw miter slot at 90°
(2) Clamp wood block to the left edge of the band saw table 1"
(3) Adjust band saw blade guard to the lowest point so that the miter guide may pass.
(4) Place box of 3/4" dowel pieces to the right at correct height.
(5) Place box on back side of band saw to catch pieces as they are cut.
(6) Place box on floor to right for scrap.

IV. PRESENTATION

(1) Orientation to band saw without power

- (a) Location of electrical plug outlet (show trainee saw is disconnected).
- (b) Location of off-on switch, blade, miter guide, and miter guide in reference to blade.
- (c) Location of material stop in reference to miter guide and blade.
- (d) Appropriate location of hands during cutting operation, (the right hand on top of miter guide holding dowel and the left hand on miter guide knob pushing dowel through the saw blade).
- (e) Location of all positions of material and boxes for finished dowels and scraps.

(2) Orientation to band saw with power

- (a) Familiarize trainee with the sound, vibrations, etc., of running saw.
- (b) Demonstrate the correct pressure and speed needed to feed the dowel through the blade.
- (c) Trainee should learn the technique of feeling the upper shield to determine when the vibrations have ceased and the saw has completely stopped. He should note the change in sound when the dowel is being cut.

Continuation of Figure 20.

(3) Operating procedure

- (a) Turn power switch to ON position
- (b) Pick up a dowel piece to be cut and place in front of guide
- (c) Push dowel to left until it touches material stop
- (d) Holding dowel in place with right hand, push the miter guide through saw blade with left hand
- (e) Pull miter guide to the front of the table and repeat cycle
- (f) Place dowels shorter than 4" in scrap boxes.
- (g) DO NOT BRUSH 1" PIECES OF DOWEL FROM BAND SAW TABLE WITHOUT FIRST SWITCHING OFF THE MACHINE AND ALLOWING IT TO STOP
- (h) UNDER NO CIRCUMSTANCES should the trainee place hands on the guide without first stopping the machine.

V. WORK ASSESSMENT

- (1) Note the number of 1" dowel pieces correctly cut
- (2) Scrap box should be checked to see if any good material has been discarded
- (3) Evaluator should not leave trainee until he uses all safety procedures as directed. No shortcuts should be allowed.

Royal Maid Association for the Blind, Hazlehurst, Mississippi.

made).

Each evaluation task includes a "competitive production rate" that is usually expressed in terms of "X" units in a 50 minute work period.

Ms. Barbara Greenstein of the Jewish Guild for the Blind (15 West 65th Street, New York, NY 10023) reports that her agency is developing revised industrial standards for these evaluation tasks.

Clawson Work Samples

Clawson (1968) developed a series of five work samples. The primary purpose of these work samples is to measure "manual skills" of blind people as a predictor of ability to function in "manual skill occupations." Initial field testing and norm development was carried out in six programs for the blind throughout the nation. Five work samples were used. These include (1) the envelope work sample, (2) the vial work sample, (3) the catheter work sample, (4) the valve work sample, and (5) the washer work sample.

The work samples were based upon an analysis of industry in Salt Lake City. They are purported to measure gross dexterity, fine motor dexterity, and sensitivity. All involve basic assembly and disassembly operations. Total testing time involves five to six hours. Initial results indicate adequate reliability and predictive validity as related to assembly jobs (Clawson, 1968).

Electromechanical Work Samples

Several work samples have been developed by the NIB that utilize timers and electromechanical devices. These electromechanical work samples were designed for use as training and evaluation tools. They focus on manipulative skills which are used in various assembly and production jobs and are particularly useful in working with multihandicapped blind persons for whom there often "exists a basic need for an objective method of assessing a trainee's functioning work ability level against an average sighted worker standard" (Richterman, 1982).

In addition to their evaluation functions, the electromechanical work samples are being used as training tools because many blind multihandicapped persons lack work concepts such as "fast" and "slow." These work samples can also be used to develop a work rhythm and to reinforce work abilities such as bi-manual coordination. Two electronic timing devices are used with the electromechanical work samples: Work Pacing Timer and Work Pace Reinforcer. Both of these timers can be set at appropriate intervals to pace a trainee's work. The timing interval can be set at an industrial standard for the task or adjusted for training purposes. When the buzzer or timed alarm sounds at the end of each interval, trainees know that they are working too slowly. When tasks are completed "on time," the buzzer or alarm does not go off, and trainees are reinforced with a pleasant clicking sound. The timers can be used with vibrators or fans for deaf-blind persons. The work pace reinforcer has a built-in counter that automatically records the number of trials and the number of times the present standard was exceeded.

The multi-functional work task unit is used with the work pace timer. To operate this work task, wooden dowels are placed in an indicated pattern on a platform, and pressure is applied to depress a series of microswitches. Various templates can be placed on the unit in order to change the positioning of the dowels. The trainee picks up two dowels, places them appropriately on the platform, waits for a reinforcing click, puts the dowels into a holding box, and repeats the operation.

The foot operated hinged box work task unit is used with the work pace reinforcer. The lid of the metal box is raised by pressing a foot pedal. Any type of small object or assembly can then be placed in the box. In this task a small bolt and nut are attached and placed in the box. The trainee assembles the bolt and nut, lifts the box lid, places the assembly inside, closes the lid, and begins again. When the lid is raised, a microswitch signals the work pace reinforcer that the task is complete.

The hinged box work task unit is very similar to the foot operated hinged box work task. In this task the top of the metal box is raised by grasping a knob on the lid and lifting. An index card is placed in a plastic bag and then placed in the box.

The index card work task unit requires that two index cards be positioned properly on a formica platform and pushed under a metal box at the top of the unit. The work pace timer is used with this work task. The trainee places two cards on the platform, pushes them under the metal box, puts one card in a completed bin, shifts the position of the other card, places a new card on the unit, and begins the cycle again.

The fine finger dexterity work task unit requires the trainee to perform a multi-step assembly. A plastic mold containing six holes is placed appropriately on a platform, four pins are placed through the outer holes, two T-plates are placed in the remaining holes, and the assembly is pressed down, signaling the timer that the task is complete. The entire assembly is removed, and the process begins again. This task involves bi-manual coordination, finger dexterity, and kinesthetic memory.

The last work sample, the revolving assembly table work task unit is designed for use by two to four trainees. Each trainee stationed around a revolving table performs a different, but related, task. The first person placed plastic vials in holes on the table, and each additional worker places an assembly in the vial as it moves past. When the vial returns to the first person, it is capped, and a new vial is placed on the table. This routine continues until the table and all vials are full. No time limit is used with this work task. It is designed to evaluate the ability to work with others and is scored subjectively. Information about these work samples is available from:

Rehabilitation Research and Training Center
in Blindness and Low Vision
P. O. Drawer 5365
Mississippi State, MS 39762
(601) 325-2001

or:

National Industries for the Blind
Rehabilitation Services
524 Hamburg Turnpike
Wayne, NJ 07470
(201) 595-9200

Other Work samples by Local Programs

The Research and Training Center, Mississippi State University, conducted a survey of work samples developed by other state schools and rehabilitation facilities (Peterson, 1982). The resulting information is summarized on the following charts.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION		
	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
National Industries for the Blind 320 Fulton Avenue Hempstead, New York 11550	Wicket assembly	Memory for sequential operations Finger dexterity Tactile strength	Place washers, spacers, wing nuts, and mat links on a wire wicket in the proper order to achieve an assembled wicket.
	Pegboard--metal strip assembly	Sitting tolerance Finger dexterity Tactual perception	Secure metal strips to outside edge holes on a pegboard with screw and wing nut.
	Mop assembly	Manual dexterity Memory for sequence of operations Material control	Place materials together in proper sequence to assemble a mop.
	Aluminum small box assembly	Following a model Frustration tolerance Memory for sequence of operations	Assemble handle from aluminum strips, metal screw, and wing nut. Secure finished handle to pre-folded box with metal screws.
	Hardware sorting	Form discrimination Size discrimination Tactual perception	Sort different pieces of hardware into appropriate slots.
	Nut and bolt machine	Size discrimination Reasoning ability Form discrimination	Find the proper nut to fit the bolt and screw on just enough to prevent it from falling off.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION		
	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
	Colored dowel sorting	Color discrimination Eye-hand coordination	Take colored dowel from the mixed box and place in the appropriate box for that color.
	Free form design--metal strips	Constructive imagination Reasoning ability Frustration tolerance	Use as many different materials as are available to create whatever design desired.
	Tool identification test	Name tools Give general description and usage	Examine tool and relate knowledge of its use and name.
	SOMA puzzle	Frustration tolerance Reasoning ability Constructive imagination	Put puzzle together to form cube shape shown before starting the assembly.
	Rubber washer counting	Counting ability Following verbal instructions Retention	Count 15 rubber washers and put them into a plastic vial.
	Basic cutting--hand saw	Math discrimination Change making skills Time concept Linear measurement skills Units of measurement knowledge Knowledge of everyday problems	Take a written test.
	Dowel cutting--hand saw	General coordination Application to work Memory for sequence of operations	Place dowel in a vise and cut to 5" lengths.

	WORK SAMPLE DESCRIPTION		
NAME/ADDRESS	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
	Dowel cutting--miter saw	Push-pull tolerance General coordination Kinesthetic memory	Place dowel on miter box and saw to 1" lengths with a miter saw.
	Dowel cutting--band saw	Standing tolerance Material control Safety awareness	Place dowel on miter box and saw to 1" lengths with band saw.
	Dowel sanding--sandpaper	Tactile strength Tactual perception Push-pull tolerance	Sand 12" lengths of dowel lengthwise until smooth.
	Cleaning oil from metal strips	Orderliness Reaction to various type materials and work conditions Application to work	Wipe oily film from metal strip until clean.
	Metal strip hole punch--kick press	Hand-foot coordination Push-pull tolerance Time and motion economy consciousness	Place metal strip in guide an press foot pedal to punch. Reverse ends of the metal strip and repeat procedure.
	Aluminum strip hole punch--kick press	Kinesthetic memory Tactile strength Hand-foot coordination	Place aluminum strip in guide and press foot pedal to punch. Reverse ends of the aluminum strip and repeat procedure.
	One-hole center drill press	Hand-foot coordination Material control Safety awareness	Place dowel in hole of the drilling jig. Press foot pedal to drill hole and release. Remove drilled dowel from job.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION		
	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
El Paso Lighthouse for the Blind 100 Donne Street El Paso, Texas 79905	Plastic heat sealer assembly	Safety awareness Kinesthetic memory Hand-foot coordination Time motion economy Tactual perception Imagine ability	Place plastic parts into a plastic bag and seal with a foot controlled sealer machine.
	Mat assembly-plain and/or design	Retention Memory for sequence of operations Kinesthetic memory	Place mat links onto mat wires to form a mat assembly.
	Collating assembly	Bi-manual coordination Manipulating ability Time motion economy	Pick up large envelope and insert a leaflet, a pamphlet, and a smaller envelope.
West Texas Lighthouse for the Blind	Hand-foot coordination trainer	Hand-foot coordination Memory for sequence of operation Reaction to electrical/mechanical work sample	Move right hand and foot in coordination. If done properly, a buzzer will sound.
East Texas Lighthouse for the Blind 1716 Forest Avenue Tyler, Texas 75702	Latch plate assembly	Adaptability to hand tool Hand-eye coordination/tactile perception. Bi-manual coordination Fine finger dexterity	Secure latch strips to latch plate with use of a rubber mallet.
	Latch plate assembly	Hand-eye coordination/tactile perception Adaptability to hand tool Manipulation of wrist	Use screwdriver as a lever to "pop" strips off the latch plate.
	Electrical conduit connector assembly	Finger dexterity Bi-manual coordination (hand) Tactile perception/hand-eye coordination	Remove screws, clamps, and locknut washers from conduit connector body and place in appropriate bins.
	Electrical conduit connector assembly	Bi-manual coordination Finger dexterity Facial expression	Place clamps on connector body, screws through clamps, and add a locknut washer.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION		
	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
	Rivet sort assembly	Finger dexterity Kinesthetic assembly Tactual perception/hand-eye coordination	Place rivet in one of three holes to determine rivet size and then place in appropriate bin.
Dallas County Association for the Blind 4245 Office Parkway P. O. Box 64420 Dallas, Texas 75206	Mopette assembly	Bi-manual coordination Frustration tolerance Speed and accuracy Tactual perception	Place sponge through hole in handle and check it. Wrap and tie mop head.
	Geometric design assembly - Design II	Five fingertip dexterity Bi-manual coordination Frustration tolerance Speed and accuracy Tactual perception	Place metal strips and U-shaped pieces on threaded metal rods. Use hex nut to tighten assembly
	Nut and bolt assembly-disassembly	Bi-manual coordination Frustration tolerance Speed and accuracy Tactual perception	Place bolt through drilled sheet and add spring, washer, hex nut, and tighten until spring compression is completely closed.
Southwest Lighthouse for the Blind	Clothes pin assembly-disassembly	Tactile perception Communication-perceptive Manipulative ability Coordination--bi-manual Concrete-abstract thinking Quantity of production	Remove arms from spring to disassemble, and then place arms back in springs to assemble.
Blind Association of Western New York (716) 882-1025	Cannisters	Fine motor coordination Ability to work at a steady pace	Assemble a small three-part metal cannister.
	Cardboard partitions	Identify main and cross pieces by size Match slot to slot Two-hand coordination	Assemble cardboard partitions by matching slots.
	Collate and staple exercise	Order and sequencing ability Two-hand coordination	Collate 25 sets of 6 pages each and place staple in upper left corner.
	Door mat assembly	Visual imagery Ability to duplicate a complex pattern	Systematically assemble rubber treaded door mat.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION		
	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
WACO Lighthouse for the Blind 700 South Fifteenth Waco, Texas 76706	Assemble metal couplings	Cross arm-hand coordination Finger dexterity Sequential assembling	Use of nuts, bolts, rubber gaskets, metal tubes, and end plates to assemble a metal coupling.
Tarrant County Assoc. for the Blind 912 W. Broadway Fort Worth, Texas 76104	M & M assembly evaluation task	Finger and fine finger dexterity Following instructions with respect to quality control Effectiveness of control using pincer grasp	Slip bolt through flaps and thread nut on just enough to hold.
	Bicycle hub	Bi-manual coordination with tools and effectiveness in setting an adjustable wrench Precision placement of ball bearings Adjustment of mechanical items to precision tolerances by feel Quality control Learning and following instructions Hand and finger dexterity Avoiding accumulation of grease on tires	Take apart, clean, and put back together properly a bicycle hub.
	Bicycle brake assembly	Hand tool proficiency Tactual identification and location Ability to sequence operations Work place layout	Methodically disassemble and reassemble brake.
	Tactual pursuit	Ability to use modeling Determine if number cordinates and directional concepts applied Effectiveness of pincer grasp	Attempt to wire a 25 spot matrix board in the same pattern as a previously wired board which serves as a model.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION NAME	ABILITIES ASSESSED	SUMMARY OF TASK
Blind Association of Western New York 1170 Main Street Buffalo, New York 14209 (716) 882-1025	Memory box	Two hand coordination Visual imagery Counting	Evaluator sets up given pattern on one board and evaluee must duplicate it on another.
	Parts-to-parts exercise	Visual and non-visual shape perception Tactile sensitivity Basic directionality Two hand coordination Eye-hand coordination	Six basic shapes have been broken down into 10 parts. Need to identify the proper parts to each shape.
	Plumbing values	Manual dexterity Fine motor coordination Mental imagery	Assemble a faucet by way of disassembly and assembly of a valve.
	Rubber band bundle	Two hand coordination	Using a rubber band, bundle 25 sets of 2 sticks.
	Sequence board	Dexterity Fine motor coordination	Many variations but used for concepts training, counting, and directionality.
	Sorting exercises 1. by shape 2. by number of holes 3. by size 4. fine motor sort	Tactile sensitivity	Sorting varied objects.
	Stick assembly	Matching sizes of blocks Mental imagery Use of small hand tools	Assemble wooden sticks into various forms either by duplication or originality.

	WORK SAMPLE DESCRIPTION		
NAME/ADDRESS	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
	String cut and tie	Use of scissors Tying knot Two hand coordination	After cutting a two part length of string, tie and bundle four sticks.
Lighthouse Industries for the Blind of Texas & Texas Commission for the Blind P. O. Box 12866 Austin, Texas 78711	Replacing dowels	Kinesthetic memory Tactile and/or visual depth perception Range of motion Manual dexterity Ability to organize materials	Pick up dowels from large box and neatly place in small boxes.
	Lacing 2 slides per strap	Finger dexterity Kinesthetic memory Bi-manual coordination Ability to measure Ability to count Speed and accuracy Tactile perception Memory of sequence of events Frustration tolerance Manipulation of medium sized limp materials	Lace slides on a strap through a serien of separate movements.
	Roll and tie straps II	Bi-manual coordination Kinesthetic memory Finger dexterity Ability to use sharp tools Manipulation of limp materials Measuring ability Speed and accuracy Ability to count objects	Wrap strap around card. Remove card and tie rolled strap with string.

	WORK SAMPLE DESCRIPTION		
NAME/ADDRESS	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
National Industries for the Blind 320 Fulton Avenue Hempstead, New York 1155	Points assembly	Fine finger manipulation Small part alignment Tool usage Retention ability Tactual perception	Assemble points.
	LAK Lamp assembly A. Wire socket	Use of a screwdriver Use of wire cutters and wire strippers Fine finger dexterity Tactile perception Bi-manual coordination	Assemble wire socket
	B. Covering socket and installing nipple	Fine finger dexterity Bi-manual coordination Hand strength Use of a screwdriver	Cover socket and install nipple.
	C. Install side button and three screws	Fine finger dexterity Finger strength Tactile perception	Install side button and three screws into lamp fitter
	D. Connect socket to fitter, insert instruction sheet, package in bag	Fine finger manipulation Manipulation of flimsy material Bi-manual coordination Finger strength	Connect socket to fitter, insert instruction sheet, package in bag.
	E. Fold instruction sheet	Bi-manual coordination Hand strength Finger strength	Fold and place instructions in holding box.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION NAME	ABILITIES ASSESSED	SUMMARY OF TASK
South Dakota School for the Visually Handicapped 423 17th Ave., S.E. Aberdeen, SD 57401	Shape and color discrimination Range of motion Sorting (tactually o by color) Three part assembly Fastener assembly Counting jig Drill press operation (13 steps) Special relationships		
Florida Division of Blind Services 2540 Executive Center Circle West Tallahassee, FL 32301	Switchboard Electronics training		
Chicago Lighthouse for the Blind 1850 W. Roosevelt Rd. Chicago, IL 60608	Tool identification Plug assembly		
Dallas Lighthouse for the Blind P.O. Box 64420 Dallas, TX 75306	Metal geometric designs		

	WORK SAMPLE DESCRIPTION		
NAME/ADDRESS	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
Pittsburg Blind Assoc. 300 South Craig Street Pitsburg, PA 15213 Hempstead, New York 11550	Packaging nuts, bolts, and screws in poly bags and heat sealing Zipcoding cards Counting cards with notched edges around them Collating Stuffing		
Dept. of Ed., Division of Blind Services, Rehabilitation Center for the Blind 1111 Willis Ave. Devtona Beach, FL 32014	PBX Electronic assembly Radio dispatch Engine and ladder Buchannon belt crimping Transcription training		
Florida Lions Conklin Center for Multi-handicapped Blind 405 White Street Daytona Beach, FL 32014	Basic tool identification Hardware sorting Collating (2, 3, 4 pages) Hardware packaging		

	WORK SAMPLE DESCRIPTION		
NAME/ADDRESS	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
St. Joseph's School for the Blind 253 Baldwin Avenue Jersey City, NJ 07306	Sorting various kinds of objects Packaging of hospital packages (care packages) Packaging of various small items into containers using jigs		
Tampa Lighthouse for the Blind 1106 W. Platt St. Tampa, FL 33606	Counting/bundling I.D. cards	Counting ability Manual dexterity Sitting tolerance	Count and straighten 25 I.D. cards and bundle with a rubber band.
	Sorting screws	Size discrimination Form discrimination Tactual perception Following verbal instructions	Put handful of screws in shallow sorting box and draw out several screws of one type and place in appropriate bin.
	Nut and screw assembly	Finger dexterity Tactual perception Frustration tolerance Material Control	Place lock washer on machine screw and thread onto hexagon nut. Do same thing except thread onto other side of the hexagon nut.
	Note pad production	Following verbal instructions Material control Bi-manual coordination Counting ability	Cut paper, stamp, and staple sheets of paper to form a note pad.
	Bi-manual bolt/nut/washer assembly	Bi-manual coordination Use of hand tools (combination wenches, vice) Standing tolerance	Place washer on bolt and stick through pre-drilled hole in 2/4, tighten.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION		
	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
	Paper punch	Motor coordination Kinesthetic memory Following instructions Tactual Perception	Punch holes in paper that is placed in a paper punch frame.
The New York Assoc. for the Blind (The Lighthouse) 111 E. 59th Street New York, NY 10022	Industrial work samples Clerical work samples Modification of some Tower and Micro-Tower into braille, large print, and tape		
Torrgut County Association for the Blind 912 W. Boradway	Nuts and bolts	Finger dexterity Bi-manual coordination	
	Pen Assembly	Bi-manual coordination Finger dexterity	Put together components of an ink pen.
	Fuel pump assembly	Bi-manual coordination Tactual perception Finger dexterity	Use hand tools to take one fuel pump apart and put an already dissassembled fuel pump.
	"Westlock" mechanical assembly	Work method Organization of parts Use of a model	Assemble and dissassemble a five board platform, held together by nuts, bolts, springs, and washers.
	Hand-eye-foot coordination	Hand-foot coordination Safety awareness Repetitive process	Insert paper into stapler, push foot pedal to staple and remove paper.

NAME/ADDRESS	WORK SAMPLE DESCRIPTION		
	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
	Order filling	Use of alphabet in a "system" Independent judgement	Remove specified parts from brailled bins. Replace some of the parts in some of the bins in accordance with a
	Rubber pad cutting	Following verbal instruction Finger dexterity Ability to use hand tools	Pull rubber pad through measuring device and cut to appropriate lengths.
	Driving nail with hammer	Bi-manaul coordination Kinesthetic memory Ability to use hand tools	Nail different sized nails into wood stock as instructed.
Travis Association for the Blind 2831 Manchaca Austin, TX 78704	Bobby pin card assembly	Fine finger dexterity Repetitive process Following a model	Stradle long side of 3" X 5" index card with bobby pins to within 1/2" of each edge.
	Paper rolling assembly	Fine finger dexterity Handling of limp material Tactual perception	Roll 9" X 10½" paper onto a 9" dowel and place a rubber band around it to hold it.

	WORK SAMPLE DESCRIPTION		
NAME/ADDRESS	NAME	ABILITIES ASSESSED	SUMMARY OF TASK
South Texas Lighthouse for the Blind 1907 Leopard Street Corpus Christi, TX 78408	Rubber pad bundling--rubber band	Counting ability Material control Tactual perception	Pick up 12 rubber pads and wrap a rubber band around them making the stack as even as possible.
	Rubber pad cutting	Following verbal instruction Finger dexterity Ability to use hand tools	Pull rubber pad through measuring device and cut to appropriate lengths.
	Driving nail with hammer	Bi-manaul coordination Kinesthetic memory Ability to use hand tools	Nail different sized nails into wood stock as instructed.
San Antonio Association for the Blind 2305 Roosevelt Avenue P. O. Box 10230 San Antonio, TX 78210	Matching shape board--color	Color discrimination Kinesthetic memory Physical orientation Use of residual vision	Place shapes on shapeboard according to size and color one, at a time. falling off.
	Double-ender pencil assembly (lip lead plunger)	Tactile strength Following verbal instructions Safety awareness Eye-hand coordination	Step-by-step construction of a double ender pencil.

COMMERCIAL WORK SAMPLE SYSTEMS AND THE VISUALLY IMPAIRED CLIENT

Two commercial work sample systems have been designed which include adaptations for the visually impaired, VALPAR and the McCarron-Dial Vocational Evaluation System. VALPAR has also specificially developed a work sample for measuring perceptual skills of the visually impaired person.

VALPAR Components Work Sample

B-Kits.

VALPAR presently has modified six of its work samples to be used with the visually impaired: Small Tools, Size Discrimination, Upper Extremity Range of Motion, Simulated Assembly, Full Body Range of Motion, and Tri-Level Measurement. These modifications, called "B-Kits" are available for $150.00 each (1980 price) for installation on existing VALPAR work samples. The B-Kits involve modifications in administration procedures as well as some modified hardware.

Both behavior (or learning style) and performance are evaluated. According to VALPAR literature, behavioral assessment pertains to the action displayed by the client in a nonrestrictive learning environment which concentrates on the client's mode of learning. It is possible to chart a learning curve "which will represent adaptive behavior for any given task" (VALPAR, 1982). VALPAR developers have attempted to separate learning from performance so that work samples may be used for assessment of learning as well as present skill level.

VALPAR adaptations for the blind include clients' additional hardware which usually provide tactual cues which substitute for visual cues. It should be noted, however, that a number of practitioners have reported that VALPAR work samples with minimal modifications are usable with visually impaired persons. This may preclude the need to purchase the modifications. The hardware modifications are summarized below.

VALPAR reports several developmental efforts to better serve visually impaired persons but, at present, research norms are available. These norms are based on ten administrations for each work sample where evaluees were employed in assembly, laminating, and packaging jobs. National norming is presently underway using rehabilitation facilities for the blind. Additionally, B-Kits nearing a stage of readiness include Numerical Sorting, Clerical Comprehension and Aptitude, Independent Problem Solving, Multi-Level Sorting, Integrated Peer Performance, Electrical Circuitry, and Print Reading. A study is presently underway to determine perceived effectiveness of VALPAR units that have been modified. Contact: John McConnell, 5722 University Avenue, Halifax, Nova Scotia, Canada 3HIV5.

CUBE

VALPAR has also developed CUBE (Conceptual Understanding through Blind Evaluation), a work sample purported to measure "the separate and collective perceptual abilities that assist a person in compensating for visual impairment" (VALPAR, 1982). The work sample consists of several parts. These parts include.

1. A stainless steel cube about 1 foot on each side mounted on a pedestal attached to a box base. The pedestal is adjustable so the CUBE can be raised or lowered to accommodate standing or seated clients.
2. An evaluation table consisting of two storage units and a flat work surface.

Cost of the CUBE is $1950 (1980 price). The CUBE battery consists of six exercises, an orientation to the work sample materials, activities, and lay-out.

In Part one, tactual perception is assessed as discrimination. These activities include discrimination between rough and smooth objects, geometric shapes, and tactual discrimination from verbal cues. Progress becomes increasingly difficult with each step. Part two, mobility discrimination, purports to measure the client's ability to move and work in a limited space and to discriminate sizes, weights, textures, and physical similarities. To assess these abilities, the client must, while working in a small triangular space, transfer objects from the evaluation table to the CUBE. Scoring is based on the evaluee's ability to remain within this restricted area.

In Part three, the spatial organization and memory element of the work sample, the evaluee must visualize, organize, and remember information that rotates from one place to another on the CUBE.

> An object remains the same in shape and configuration but is no longer in the same position after rotation. The evaluee is asked to reproduce a number of shapes from a side panel on the CUBE in the same dimensions of a top panel (VALPAR, 1982).

For Part four, assembly and packaging, an attempt is made to measure client's ability to select appropriate packaging materials. The client is asked to complete a cylinder assembly using rings, couplers, and an assembly jig. Once again, the tasks move from simple to complex. The last task requires the client to complete an elecrical wiring assembly.

Part five, audile perception, attempts to measure the ability to use auditory input for tasks requriing mobility and understanding. Several exercises are used which again begin with more simple exercises and progress to more diffcult ones. For example, a small sound device is used to emit a continuous tone. The client is asked to identify where the sound is coming from as the evaluator moves about the room. The exercises for sound identification begin with recorded versions of common sounds such as a telephone or doorbell and move to environmental sounds such as a checkout stand in a grocery store; the visually impaired person is finally asked to decipher three simultaneous conversations.

The CUBE attempts to assess traits that have been previously identified as important for visually impaired persons (Bauman, 1975). However, no research has been reported on the practical and programmatic usefulness of the CUBE in the job or training placement of visually impaired individuals.

McCarron-Dial Work Evaluation System

The McCarron-Dial Work Evaluation System (MDWES) has also been adapted for use with the visually impaired population (McCarron, 1980). Modifications include

1. use of the verbal portion of the WAIS to measure verbal-cognitive skills,
2. substitution of a specially designed test, the Haptic Memory Matching Test (HMMT) for the Bender-Gestalt, and the Haptic Visual Discrimination Test (HVDT) as a measure of sensory abilities, and
3. changes in the administration procedures for the motor tests--McCarron Assessment of Neuromuscular Disability (MAND).

As with the standard MDWES, five factors are used to analyze evaluee strengths and weaknesses and to determine the general level of vocational functioning, e.g., placement in a continuum of vocational services: day care, adult activity, extended sheltered employment, and transitional/community programming.

Non-commercial Adaptations of Work Sample Systems

Many rehabilitation facilities and state schools use commercial work sample systems with visually impaired persons and have often made modifications of these tests. Summaries of systems listed below are presented on the following pages and are followed by a brief discussion of the use of each with visually impaired persons. In some cases, specific modifications are identified.

1. Comprehensive Occupational Assessment and Training System (COATS)
2. Hester Evaluation System (HES)
3. Jewish Employment and Vocational Service Work Sample System (JEVS)
4. McCarron-Dial Work Evaluation System (MDWES)
5. Micro-Tower (MT)
6. Prevocational Readiness Test (VALPAR #17)
7. Project Discovery
8. SAGE
9. Talent Assessment Programs (TAP)
10. Tool Technology (MIND)
11. TOWER system
12. VALPAR Component Work Sample Series
13. SINGER Vocational Evaluation System
14. Vocational Information and Evaluation Work Samples (VIEWS)
15. Vocational Skills Assessment and Development Program (USADP)
16. Vocational Temperament and Aptitude System (VITAS)
17. Wide Range Employability Sample Test (WREST)

COMPREHENSIVE OCCUPATIONAL ASSESSMENT AND TRAINING SYSTEM (COATS)

Prep, Incorporated
1575 Parkway Avenue
Trenton, New Jersey 08628

Target Group: Secondary students, all disabilities. Blind and Deaf individuals may experience difficulties.

Summary

COATS is one of the most comprehensive vocational assessment systems available; it contains four components:

1. Job Matching System: A computer printout match of the evaluee to training programs or jobs based on the evaluee's responses to 15 audio-visual cartridges dealing with preferences, experiences, and abilities is provided to the vocational evaluator.
2. Employability Attitudes System: The evaluee's attitudes and behaviors are determined and are compared with attitudes that employers see as important. Six audio-visual cartridges containing simulated work situations are used in the evaluation process.
3. Work Sample System: Twenty-six work samples have been developed around the U.S.O.E. clusters. Work samples include electrical, automotive, clothing and textiles, sales and medical services.
4. Living Skills System: Six audio-visual cartridges containing 18 "adventures" evaluate the following evaluee skills and knowledges: reading, writing, computation, problem-solving,

speaking-listening, consumer economics, occupational knowlege, community resources, health, and governmental law.

Process

These four components may be used independently of each other. The Job Matching System may be used to screen the student for the most appropriate work samples to be administered. To complete all 26 work samples, 52-93 hours are required; however, only four to ten are usually used for one person. All components except the work samples may be administered to small groups. An eighth grade reading level is required for use of written materials which can, however, be read to the evaluee.

Reports

All reports are computer scored and returned with a detailed interpretive print-out. The work samples, however, may be hand scored.

Use with Visually Impaired Individuals

All components of COATS are highly dependent on the use of audio-visual materials. However, for use with the partially sighted and the blind evaluee, some modifications are possible. When filmstrips are used, the audio content is relatively explicit, thus allowing COATS to be used with blind and visually impaired persons. Botterbusch (1980) considers COATS the most comprehensive commercial vocational evaluation system. Its main drawback is cost, but component parts may be purchased separately. A strength of the work samples for use with visually impaired populations is that they focus on skilled and technical professions. This focus affords the evaluator an opportunity to assess visually impaired people for occupations at these levels. Modifications in administrative procedures and the use of adapted materials and tools will need to be employed. However, no rehabilitation facilities for visually impaired people report using COATS and no studies been identified using COATS with this population.

Cost

Job Matching System	$2,080.00
Employability Attitudes	$1,285.00
Living Skills	$1,275.00

Work Samples--range from $435,00 to $1,450.00 each, with consumable supplies provided for 20 persons. Average cost per person for scoring is $5.00.

HESTER EVALUATION SYSTEM (HES)

Evaluation Systems, Inc.
640 N. LaSalle Street
Suite 698
Chicago, IL 60601

Target Group: All disabled population

Summary

HES employs 26 separate performance and paper-and-pencil tests to measure 28 ability areas which are classified into seven groups:

1. unilateral motor ability,
2. bilateral motor ability,
3. perceptual,
4. perceptual motor coordination,
5. intelligence,
6. achievement, and
7. physical strength.

Scores on these seven groups are intended to relate the client's abilities to the data-people-things system of the DOT.

Process

The components of HES are given in a testing atmosphere. Evaluee input and feedback appear to be of little importance. The battery can be administered in five to seven hours. Some tests are administered individually; others may be administered in small groups.

Reports

Standardized forms are used to input data which are processed by computer at the HES Chicago office (by mail or by direct computer terminal linkage). The computer print-out contains four major sections:

1. demographic information,
2. scores for each test,
3. data-people-things hierarchies showing the evaluee's level of functioning, and
4. specific DOT job titles sorted from most to least feasible.

Use with Visually Impaired Individuals

Most HES performance tests rely on visual-perceptual cues. HES modifications for the visually impaired client appear to be somewhat difficult. No commercial adaptations are available or planned. The lack of information concerning validity and the procedures used for matching assessed traits with jobs is of concern. Botterbusch (1980) recommends using the HES for "initial screening at the beginning of the vocational evaluation process." One survey respondent reported using HES as a screening instrument with visually impaired clients:

Addie McBryde Rehabilitation Center for the Blind
P. O. Box 5314
Jackson, MS 39216

Contact: Victoria Houser (601) 354-6428

Cost

$7,200.000 for all equipment, paper-and-pencil tests, data sheets, forms for 100 clients, and evaluator training in the use of the HES.

JEWISH EMPLOYMENT AND VOCATIONAL SERVICE
WORK SAMPLE SYSTEM (JEVS)

Vocational Research Institute Jewish Employment and Vocational Service 1700 Samson Street, 9th Fl. Philadelphia, PA 19103	Target Group: Disadvantaged and other special needs groups.

Summary

JEVS is based upon a trait-factor approach which uses work samples to assess aptitudes and behaviors as related to the worker trait groups of the DOT. Twenty-eight work samples are arranged in ten worker-trait groups.

1. handling;
2. sorting;
3. inspecting, measuring, and related work;
4. tending and manipulation;
5. routine checking and recording;
6. classifying, filing, and related work;
7. inspecting and stock checking;
8. craftsmanship and related work;
9. drafting and related work; and
10. costuming, tailoring, and dressmaking.

Process

The 28 work samples are administered in order of difficulty. Work sample administration resembles a formal testing situation, and evaluee input and feedback is not emphasized. Six or seven full days are required to complete all 28 work samples.

Reports

Standardized forms are used for each work sample.

Use with Visually Impaired Individuals

While a number of rehabilitation facilities report using the JEVS with the visually impaired, no commercial adaptations or studies have been implemented, though JEVS has considered possible adaptations (Bauman, 1975). Among facilities reporting using the JEVS is:

Jewish Guild for the Blind
15 W. 65th Street
New York, NY 10023

Contact: Ms. Barbara Greenstein (212) 595-2000

The reliance of the JEVS system on the trait system defined in the DOT impaired its use with the visually impaired (see discussion of trait approach in Chapter 3). Additionally, the low face validity of the JEVS tasks limits career exploration; in some cases, traits required by the task are not the same as traits needed by the blind or visually impaired person on the job. Dicksen (1976) has suggested that the JEVS be modified as follows:

Work Sample	Suggested Modifications
Nut, bolt, washer assembly	Make sure all parts are present. Have one of each set assembled as a model
Rubber stamping	Sight required to follow model, but verbal instructions could be substituted.
Washer threading	Use raised or specially marked ruler.
Budgette assembly	Provide metal needle threader and raised or marked ruler or a sample piece of string of the correct length.
Sign making	Requires measuring the drawing. May not be related to feasible jobs.
Tile sorting	Requires enough vision to discriminate colors.
Nut packing	No modifications needed
Collating leather samples	Requires sight to discriminate colors and textures.
Grommet assembly	Can be done totally by feel.*
Coupling (union)	Can be done totally by feel with good description and if client is familiar with terms. May provide model or use wide felt tip pen to draw diagram for partially sighted clints.
Belt assembly	No modifications needed.

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*CAUTION: During administration of the grommet assembly work sample, make sure that the client keeps fingers outside of, not on top of or underneath, the grommet while pressure is being applied. Having a fingernail under the grommet can result in a painful injury.

Work Sample	Suggested Modifications
Metal square fabricating	Has written instructions. May be dangerous and unrelated to feasible job.
Hardware assembly	No modifications needed.
Telephone assembly	Instructions are written and diagramed. Requires color discrimination for wires. May be unrelated to jobs held by visually impaired clients.
Large lock assembly	Put tape on top for identification. Make simplified diagram with heavier black lines for those with some vision.
Filing by numbers	Impractical for low vision. May be done in braille or large print if jobs could adapted.
Proofreading	Impractical for low vision. DOT lists job for braille proofreader, so could be adapted to that.
Filing by three letters	Same as for filing by numbers.
Nail and screw sorting	Could be done totally by feel.
Adding machine	Tedious and impractical unless done in large print or braille.
Payroll computation	Impractical.
Computing postage	Impractical.
Typing	Make into dictaphone typing.
Resistor reading	Requires good sight.
Pipe assembly	No modifications needed.

Work Sample	Suggested Modifications
Blouse making	Best for someone with prior knowledge of basic sewing techniques.
Vest making	Best for someone with prior knowledge of basic sewing techniques.
Condensing principle drawing	Impractical, unrelated to feasible jobs.

Cost

$7,975.00 includes all work samples, forms, shipping, and tuition for the required training of one person in Philadelphia. Transportation and room and board expenses must be borne by the purchaser.

McCARRON-DIAL WORK EVALUATION SYSTEM (MDWES)

McCarron-Dial Systems
P. O. Box 45628
Dallas, Texas 75245

Target Groups: Developmentally disabled individuals.

Summary

The MDWES was designed to predict client program placement in activity centers, sheltered workshops, or competitive employment. Five evaluee traits are assessed:

1. verbal-cognitive,
2. motor,
3. sensory,
4. emotional, and
5. integration-coping

The tests used to assess these skills include: the Wechsler or Stanford-Binet intelligence tests, the Peabody Picture Vocabulary Test, the Bender Motor Gestalt Test, the Haptic Visual Discrimination Test, the McCarron Assessment of Neuro-muscular Development (MAND), and two observation forms--the Observational Emotional Inventory (OEI), and the Behavior Rating Scale (BRS). The Street Survival Skills Questionnaire (SSSQ) has recently been added as a measure of adaptive behavior.

Process

All assessment except the OEI and BRS may be done in four to six hours in an individual, formal testing situation. The behavior ratings are designed for use in a sheltered workshop setting over a period of one week. None of the tests requires the evaluee to read.

Reports

Standardized forms are used, including a profile form with the final report. The manual gives examples of narrative reports.

Use with Visually Impaired Individuals

The MDWES was designed to assess the ability of mentally disabled persons to function at job levels.

Botterbusch (1980) suggests that the MDWES may be best used as ". . a preliminary assessment device for assessing general levels of functioning prior to . . ." more comprehensive assessment. As previously discussed, the MDWES is one of the few commercial vocational evaluation systems that has made specific modifications for the visually impaired. One program reporting use of the MDWES is:

Travis Association for the Blind
2831 Monchaca
Austin, Texas

Contact: Ms. Rebecca Langford (512) 442-2329

Cost

The five separate kits of the MDWES cost:

Auxiliary (PPVT, Bender, etc.)	$168.00
Haptic	$296.00
HMMT Adaptation	$567.00
MAND	$236.00
SSSQ	$125.00
HNMT	$490.00
	$1,882.00

MICRO-TOWER (MT)

Micro-Tower ICD Rehabilitation and Research 340 East 24th Street New York, NY 10010	Target Group: All special needs groups except the trainable mentally retarded.

Summary

The MT is basically a group aptitude test which uses work sample methods to measure seven aptitudes which are similar to those defined in the DOT. Thirteen work samples are used to measure these aptitudes:

1. Motor: electronic connector assembly (F), bottle capping and packaging (M), and lamp assembly (K);
2. Spatial: blueprint reading (S), and graphics illustration (S,K);
3. Clerical Perception: filing (Q), mail sorting (Q,M), size coding (Q), and record checking (Q);
4. Numerical: making change (N), and payroll computation (N); and
5. Verbal: want ads comprehension (V), and message taking (V).

Process

These work samples are administered in small groups over a period of 15-20 hours. Instructions are given by evaluator demonstration and audio-cassette tape. No written instructions are used. There are five steps in each work sample:

1. occupational orientation,

2. basic instructions,
3. practice,
4. timed evaluation, and
5. self evaluation.

Reports

Standard forms are used to record performance, and three forms are used for the final report. A computer print-out which relates results to specific jobs in the DOT is also available.

Use with Visually Impaired Individuals

The MT uses a standardized psychological testing approach to aptitude assessment. The group administration maximizes evaluator time, but it may hinder attention to the individual evaluee. This may be particularly true when it is administered with both visually impaired and sighted clients. One rehabilitation facility reports having brailled some of the MT materials:

New York Lighthouse for the Blind
11 E. 59th Street
New York, NY 10022

Contact: Wesley Sprague (212) 355-2200

Cost

The cost depends on the number of evaluees tested in a group. Since each person requires a separate set of equipment, prices below include forms for 100 persons per work sample.

# Persons Tested	Price
4	$7,943
7	$9,023
10	$10,103
20	$13,703
30	$17,303

PREVOCATIONAL READINESS TEST (VALPAR #17)

VALPAR Corporation
3801 E. 34th Street
Tucson, Arizona 85713

Target Group: Retarded

Summary

VALPAR #17 is designed to assess the functional skills of mentally retarded persons. The work sample contains five areas, each of which has several components.

1. Developmental Assessment: measures pattern/color discrimination and manipulation, manual coordination; work range; dynamic strength; walking; and matching/vocational knowledge/measurement.
2. Workshop Evaluation: simulates an assembly process.
3. Vocational Interest Screening: uses sound/slide interest/assessment format.
4. Social/Interpersonal Skills: contains a two page rating form.
5. Independent Living Skills: focuses on transportation, money, skills, grooming, and living environment skills.

The instructions and processes are designed for more severely mentally handicapped students.

Process

Most tasks are administered individually over five and one half hour period.

Reports

Each of the five areas uses standardized forms for recording responses and scoring. An Individual Exit Profile provides a summary of all five areas.

Use with Visually Impaired Individuals

The system is attractive and well designed. However, inadequate technical information is provided in the manual. The system appears to have the most potential for severely mentally retarded people. While specific adaptations for the visually impaired are not available, area 1, 2, 3, 4 and parts of 5 appear to be usable with modifications. Other component areas would require substantial modification due to their reliance on visual cues. No rehabilitation facility included in the survey reported using VALPAR #17 with visually impaired individuals.

COST

$3,200.00

PROJECT DISCOVERY

Experience Education
401 Reed Street
Red Oak, Iowa 51566

Target Group: All

Summary

Project Discovery was originally developed as a career exploration tool to be used by special needs students. Twenty-seven modules have been developed that provide hands-on learning exploration experiences in the following career clusters: construction, transportation, business and office, marketing and distribution, communications and media, public service, agri-business and natural resources, consumer and homemaking, health occupations, personal services and manufacturing. Project Discovery has recently made efforts to systematically use these modules for vocational education. Analysis has been done on each work module so that skills and abilities required for each module are described in terms of worker characteristics as described in the *DOT*.

Process

Students use various modules in Project Discovery based on an Individualized Assessment Plan. Student responses are recorded on a composite "Qualifications Profile" sheet which uses terms associated with the *DOT*. A worker interest survey and other resources are used to identify student interest. A publication entitled *Classification of Jobs According to Worker Trait Factors* (Field & Field, 1980) is used to compare the student profile to the profile required of various jobs as listed in the DOT.

Reports

Helpful reporting forms for each module and suggestions for compiling a final report are available.

Use with Visually Impaired

Project Discovery employs a "direct observation" approach to vocational evaluation that is criterion-referenced and task oriented. This approach easily combines exploration and assessment and relates these to terms in the DOT. The vocational evaluation manual provided is both thorough and practical. If modules are modified using adaptive materials for blind people, Project Discovery offers a good career exploration and assessment tool. No programs for blind people, however, have reported use of these modules.

Cost

Modules vary in price from $50.00 to $1,950.00 each.

SAGE

Progressive Evaluation
Systems Corporation
21 Paulding St.
Pleasantville, NY 10570

Target Group: All

Summary

SAGE is a battery of psychological, performance, and aptitude tests that attempts to measure traits as defined by DOT and to compare an individual's worker Qualifications Profile with the requirements of jobs as published in the Classification of Jobs According to Worker Trait Factor (Field & Field, 1980). The system consists of four parts.

1. Vocational Interest Inventory (VII): presented to the client via an audio-visual format coordinated with an inventory booklet;
2. Cognitive and Conceptual Abilities Test (C-CAT): designed to measure General Education Development (GED) and reasoning, language and math aptitudes;
3. Vocational Aptitude Battery (VAB): an aptitude test measuring all eleven DOT aptitudes; and
4. Assessment of Work Attitudes (AWA): a written test in which an individual evaluates real life, work-oriented situations. The evaluee responds to each situation by estimating how many people would act, think, or feel a certain way in a situation.

A Work Readiness Index is developed which is supposed to indicate a person's level of work readiness. Software for use with microcomputers in matching jobs and client characteristics is also available.

Process

Administration takes around four hours.

Reports

Clear report forms are provided on which scores are converted to DOT Worker Qualifications Profiles numbers. This profile may then be compared to job requirements.

Use with Visually Impaired

No information is presently available concerning SAGE's use with visually impaired persons.

Cost

VAB	$4,995.00
VII	$ 500.00
C-CAT	$ 500.00
AWA	$ 500.00
Total	$6,495.00
Software for TRS-80 III	$ 950.00

TALENT ASSESSMENT PROGRAMS (TAP)

Talent Assessment, Inc.
P. O. Box 5087
Jacksonville, FL 32205

Target Group: All except TMR.

Summary

TAP consists of ten tests of perceptual and dexterity skills that measure dexterity, visual and tactile discrimination, and retention of details. The test results are compared to the job titles of the DOT. The ten tests included are:

1. structural and mechanical visualization,
2. discrimination by size and shape,
3. discrimination by color,
4. tactile discrimination,
5. fine dexterity without tools,
6. gross dexterity without tools,
7. fine dexterity with tools,
8. gross dexterity with tools,
9. flowpath visualization, and
10. retention of structural and mechanical detail.

Process

TAP lends itself to a formal testing atmosphere and can be administered in around two and one-half hours. Vocational exploration and evaluee involvement are minimal. All tests are individually administered, and no reading is required.

Reports

A raw score form and profile sheet are used. The profile sheet contains a profile of the percentile scores for each work sample, a Talent Quotient (based on the total weighted results), and a space for a narrative report.

Use with Visually Impaired

TAP does not claim to assess all vocationally significant abilities; it assesses dexterity, retention, and discrimination abilities. Use of TAP for vocational placement, therefore, must be complimented by additional assessment information. No specific adaptations are reported for the visually impaired population. All of the ten tests except color and flow path visualization can be adapted for the use of blind clients. However, two standard dexterity tests adapted by Bauman (1968) are used with the system; modification on these two tests may be made for the partially sighted.

Cost

$13,100.00. Price includes delivery and on-site staff training.

TOOL TECHNOLOGY (MIND)

MIND Incorporated
181 Main Street
Norwalk, Connecticut 06851

Target Group: All

Summary

MIND is not a vocational assessment system by design. No norms are available. Assessment information can be collected, however, using Tool Technology. Tool Technology is basically an in-depth, hands-on audiovisual that provides training in the use of basic hand tools. Modules are available in 16 areas: general screwdrivers, general wrenches, painting tools; hammers; rules, squares, and levels; hand drills; pliers; cutting tools; socket wrenches; hand saws; files and planes; meters and gauges; pipe fitting tools; micrometers and metric rules; and squares and levels.

Process

A student uses a videotape cartridge that directs him through work activities involving the use of small tools. The evaluator observes the student and makes notations on standard forms concerning abilities.

Reports

Standard forms are provided.

Use with the Visually Impaired

MIND is highly dependent upon visual teaching devices. Those with useful vision could use the system. However, for the totally blind student or client, significant modifications would need to be made. These include substitutions of adaptive materials, e.g., a micrometer with raised markings. Despite these problems, however, the teaching format of MIND does provide opportunities for assessment of learning abilities, pace and style. MIND purports to relate tool use to worker trait groups in the DOT. The materials can be used for both assessment and prevocational training. In terms of assessment, they may be especially useful in determining whether a visually impaired student can learn through an audio-visual format. The MIND was reported to be in use in at least one institution serving a visually impaired population:

Wisconsin School for the Visually Handicapped
1700 W. State Street
Janesville, Wisconsin 53545

Contact Mr. Robert Arnot (608) 775-2977

Cost

Combined instruction-assessment AV modules	$465.00 each
Simulator board (1 per station)	$ 95.00
AV instrument	$498.00

THE TOWER SYSTEM (TOWER)

ICD Rehabilitation Research
340 East 24th Street
New York, NY 10010

Target Group: Disadvantaged; disabled

Summary

TOWER contains 93 work samples arranged into 14 job training areas: clerical, drafting, drawing, electronics assembly, jewelry manufacturing, leather goods, machine shop, lettering, mail clerk, optical mechanics, pantograph engraving, sewing machine operation, welding and workshop assembly. Unlike other work sample systems, TOWER does not sell hardware. Each program must construct its own work sample from plans.

Process

TOWER work samples are presented in order of complexity in each job area. Completion of all work samples takes approximately three weeks, but few evaluees are asked to complete all work samples. A fairly high reading level is required. The sophisticated work samples tasks minimize its use with low literate and mentally retarded students. TOWER's use of realistic work samples is emphasized, which may encourage significant vocational exploration by the client.

Reports

Standardized forms are used. The three page final report contains work and personal characteristic ratings for each of the 14 job areas.

A narrative report is also included.

Use with Visually Impaired Individuals

TOWER suffers from the same problems that any test with written and pictorial instructions has. Use of modified administration instructions and adaptive tools, however, could make the TOWER usable with visually impaired clients. Two rehabilitation facilities reported using the TOWER with visually impaired persons. The second program indicates that it has brailled some of the TOWER materials.

1. Jewish Guild for the Blind
   15 West 65th Street
   New York, NY 10023
   Contact: Ms. Barbara Greenstein (212) 595 2000

2. New York Lighthouse for the Blind
   111 E. 59th Street
   New York, NY 10022

   Contact: Mr. Wesley Sprague (212) 355-2200

Cost

$300.00 for copies of work sample manuals and forms. Estimates to construct all work samples is $5,000.00. Training is required for purchase.

VALPAR COMPONENT WORK SAMPLES SERIES (VALPAR)

Valpar Corporation
3801 E. 34th Street
Tuscon, Arizona 85713

Target Group: All special needs, especially industrial disabled.

Summary

VALPAR currently consists of 16 individual work samples which attempt to measure single worker traits such as eye-hand-foot coordination. Work samples include: small tools (mechanical), size discrimination, numerical sorting, upper extremity range of motion, clerical comprehension and aptitude, independent problem solving, multi-level sorting, simulated assembly, whole body range of motion, tri-level measurement, eye-hand-foot coordination, soldering and inspection, money handling, integrated peer performance, electrical circuitry and print reading, and drafting. VALPAR is a unified work sample system. Its components or 16 work samples may be purchased separately.

Process

Each of the work samples can be completed in one to two hours. Reading is required only for those samples representing jobs which require reading. Modifications for use with visually impaired persons are available for the first ten components. Videotapes and signed instructions are available for deaf persons on VALPAR except for integrated peer performance, which is the only work sample not individually administered.

Report

A separate reporting form is used for each work sample. No suggestions or format are provided for a final report.

Use with Visually Impaired Individuals

As discussed previously, VALPAR has made commerical adaptations for the visually impaired client. However, some practitioners report that most VALPAR work samples can be used effectively with a few modifications. Dicksen (1976) states that many of the samples "may be used with blind clients with little or no modification since no reading is required." Some require a considerable amount of vision, while others can be done totally by feel. As with all the systems, it is important that the client be allowed plenty of time to become oriented to the task, learn where all the parts are and what is expected before testing. Dicksen (1976) has also identified suggested modifications for several of the work samples.

Work Sample	Suggested Modifications
Small tools (mechanical)	Verify that all tools and correct number of parts are in tool kit. Ask client if he has any specifically adapted tools he usually uses.
Size discrimination	No modifications needed.

Work Sample	Suggested Modifications
Numerical sorting	Person must have enought vision to see small black numbers on white plastic chips.
Upper extremity range of motion	Can be done totally by feel with modifications.
Clerical comprehension and aptitude	Requires reading and using standard forms. Good vision required.
Independent problem solving	Requires vision. Evaluator can punch answers in answer sheet.
Multi-level sorting	Requires enough vision to read small numbers on plastic chips.
Simulated assembly	No vision or modifications needed.
Whole body range of motion	No vision or modifications needed.
Tri-level measurement	Requires vision adequate to read numbers on a micrometer. Limited feasible jobs.
Small Tools (mechanical)	Verify that all tools and correct number of parts are in tool kit.
Size discrimination	Ask client if he has any specially adapted tools he usually uses.
Numerical sorting	Person must have enough vision to see small black numbers on white plastic chips.
Upper extremity range of motion	Can be done totally by feel with modifications.
Clerical comprehension and aptitude	Requires reading and using standard forms. Good vision required.
Independent problem solving	Requires vision. Evaluator can punch answers in answer sheet.

Work Sample	Suggested Modifications
Multi-level sorting	Person must have enough vision to see small black numbers on small numbers on plastic chips.
Simulated assembly	No vision or modifications required.
Whole body range of motion	No vision or modifications required.
Tri-level measurement	Requires vision adequate to read numbers on a micrometer. Limited relationship to feasible jobs.
Eye-hand-foot coordination (electronics)	Requires vision.
Soldering and inspection	Manual suggests should not be used by visually impaired.

VALPAR was reported as the most used commercial vocational evaluation system by programs working with blind persons. Following is a listing of facilities reported to use elements of the VALPAR system.

1. Virginia Rehabilitation Center for the Blind
   401 Azaiea Avenue
   Richmond, VA 32227

   Contact: Mr. Steve Boston (804) 264-3151

2. Tampa Lighthouse for the Blind
   1106 W. Platt Street
   Tampa, FL 33606

   Contact: Mr. W. D. Sims (813) 251-2407

3. Addie McBryde Rehabilitation Center for the Blind
P. O. Box 5314
2550 Peachtree Street
Jackson, MS 39216

Contact Ms. Victoria Black (601) 354-6428

4. Arizona State School for the Deaf and Blind
P. O. Box 5545
Tucson, AZ 85703

Contact: Ms. Doris Senor Waltman (602) 628-5938

5. Iowa Braille and Sight Saving School
1102 G. Avenue
Vinton, Iowa

Contact: Mr. Bruce Armstrong (319) 472-2811

6. Arkansas School for the Blind
2600 West Markham
P. O. Box 668
Little Rock, Arkansas

Contact: Ms. Jeanette Horton 663-4165

7. Vision Center of Central Ohio
1393 N. High Street
Columbus, Ohio 43201

Contact: Ms. Joanna R. Bethel (614) 294-5571

8. Travis Association for the Blind
2831 Manchaca
Austin, Texas

Contact: Ms. Rebecca Langford (512) 442-2329

Cost

Each of the work samples is priced separately. The prices range from $495.00 to $900.00 each.

THE SINGER
VOCATIONAL EVALUATION SYSTEM (SINGER)

Singer Educational Division
Career Systems
80 Commerce Drive
Rochester, NY 14623

Target Group: All

Summary

SINGER includes 25 work samples, each sold in a separate carell. Each carell contains an audio-visual instrument and the tools needed to complete the work sample. Each work sample relates to a specific cluster of occupations. Work samples include bench assembly, plumbing and pipe fitting, woodworking, cooking and baking, small engine service, medical service, cosmetology, data calculation and recording, soil testing, photo lab technician, household and industrial wiring, welding and brazing, and office services.

Process

Each work sample is individually administered. Each takes two and one-half hours to complete. All instructions are prerecorded and presented to the evaluee by a film-strip and audio-cassette tape. A slide interest inventory is given to help determine which work samples the evaluee should take. Each work sample begins with occupational information concerning the work area being assessed. This is followed by step-by-step instructions for the task. The work samples can be used in any order. Some filmstrip modifications are available for deaf and hard-of-hearing individuals.

Reports

Standard forms are used. No recommended final report is provided.

Use with Visually Impaired Individuals

The audio-visual format of the system provides some difficulties for visually impaired persons. However, clients with useful vision should find little difficulty. Dicksen (1976) reports successful use of Singer by the Wisconsin School for the Visually Handicapped "for evaluation, for exploration, for hands-on experiences in regularly defined situations, for listening to directions, for relation to our mobility program, for staff involvement." Most for the students at the Wisconsin School evaluated on the SINGER were partially sighted.

For the totally blind evaluee, Dicksen (1976) reports the use of slight modifications including " . . . use of braille rulers, individual instruction, descriptions of tool locations and reference points on the objects being fabricated; the required length that preceded it; large-face type on 3" X 5" cards in the Office Trades work station; use of an awl instead of a pencil to scratch-mark wood; and use of a small tray in the Bench Assemby task to hold initial selection of one screw and one bolt of each type.

Dicksen (1976) has suggested the following modifications of specific SINGER work samples:

Work Sample	Suggested Modifications
Basic tools	Try-square for repeated measurements, and awl to scratch-mark wood.
Bench assembly	No modifications needed.
Drafting	Requires sight for measuring and drawing. Limited relationship to feasible jobs.
Electrical wiring	Braille rulers, try-square. Limited relationship to feasible jobs.
Plumbing and pipefitting	Braille ruler, try-square, awl.
Carpentry and woodworking	Braille ruler, try-square, awl.
Refrigeration, heating, and air conditioning	Braille ruler, awl.
Soldering and welding	May be dangerous for client with very low vision. Limited relationship to feasible jobs.
Office and sales clerk	Requires reading of small forms. Use large type on 3" X 5" cards or braille if forms can be used.
Needle trades	Needle threader, tape on bobbin plate to indicate seam distance. Good relationship to jobs held by many workers.
Masonry	Special level and measuring devices. Limited relationship to feasible jobs.
Sheet metal working	Measuring devices. Limited relationship to feasible jobs.
Cooking and baking	Measuring cups, oven markings must be marked for tactual use.

Work Sample	Suggested Modifications
Cooking and baking	Measuring cups, oven markings must be marked for tactual use.
Small engine service	Requires some sight, special tools.
Medical service	Poor relationship to feasible jobs. Requires adequate sight.
Cosmetology	Requires some sight to match colors.
Data calculation	Impractical without good vision due to standard forms with small spaces.
Sample making	Requires some vision. Use braille or specially marked ruler.
Soil testing	Requires some vision. May be unrelated to feasible jobs.

Programs that have used SINGER with visually impaired persons include:

1. Department of Human Services-Visual Services
   400 Sequoyah Building
   State Capitol Complex
   Oklahoma City, OK

   Contact: Mr. Travis Harris (405) 521-3451

2. Vision Center of Central Ohio
   1393 N. High Street
   Columbus, OH 43201

   Contact: Ms. Joanna R. Bethel (614) 294-5571

Cost

Cost per work station ranges form $1,150.00 to $2,190.00, with a mean cost of $1,544.00. The price includes shipping and enough supplies for 30 evaluees.

VOCATIONAL INFORMATION AND EVALUATION WORK SAMPLES (VIEWS)

Vocational Research Institute
Jewish Employment and
Vocational Service
1700 Samson Street
Philadelphia, PA 19103

Target Group: Mentally retarded individuals.

Summary

The VIEWS contains 16 work samples that are used for four areas of work and six worker trait groups of the DOT. These areas were chosen because they represent the most common areas of training and employment for mentally retarded persons. The four areas of work represented are elemental handling and feeding, clerical, machine tending and crafts.

Process

Each work sample uses the following procedures: demonstration, training, and production. Training is provided on each task to a criterion level prior to the timed testing to ensure that the evaluee understands the task. Work samples are presented in order of least-to-most complex. The total system can be administered in 15-30 hours.

Reports

Three types of standardized forms are used. A comprehensive final report format allows suggestions for a broad range of information.

Use with Visually Impaired Individuals

The VIEWS should be easily adaptable with multihandicapped visually impaired persons. The provisions for a learning/practice period may provide useful learning assessment information for many visually impaired clients including the multihandicapped population. There is no literature available concerning its use with the visually impaired population and no programs for the visually impaired report its use.

Cost

$7,675.00 includes work samples, manuals, forms, shipping, tuition for training, and one on-site visit. Training is required for purchase; travel expenses must be paid by the purchaser.

VOCATIONAL SKILLS ASSESSMENT AND DEVELOPMENT PROGRAM (VSADP)

Broadhead-Garrett Company
4560 East 71st Street
Cleveland, OH 44105

Target Group: All special needs groups.

Summary

VSADP is intended to provide a continuous program from initial assessement through training and job placement in three phases.

1. assessment;
2. seven vocational components used for occupational information and development of entry-level skills--basic tools, sheltered employment, building maintenance, health, agri-business, clerical/sales, construction trades; and skills training for entry level skills in seven areas: health, agri-business, building maintenance, clerical/ sales, automotive, small engine and construction.

Phase I, assessement, is the only phase that can really be considered vocational assessment. This phase consists of the following activities: sorting, assembly, and salvage.

Process

Assessment components may be given in any order. Little information is provided concerning administration and scoring.

Reports

Three report forms are used:

1. a recording of time, errors, and total scores;
2. an Adjustment Instrument containing 14 characteristics dealing mainly with personal and social adjustment; and
3. a Work Habits Instrument which focuses on the performance of tasks by the evaluee.

Use with Visually Impaired Individuals

Botterbusch (1980) writes that Phase I " . . . lacks detailed evaluation and client instructions, norms, proper set-up procedures, and scoring methods . . . The manual does not give enough information to accurately use the system." There is no research literature detailing the use of this system with visually impaired persons. No rehabilitation facility or school surveyed reported using it in the vocational evaluation of visually impaired persons.

VOCATIONAL TEMPERAMENT AND APTITUDE SYSTEM (VITAS)

Vocational Research Institute
Jewish Employment and
Vocational Service
1700 Samson Street
Philadelphia, PA 19103

Target Group: Disadvantaged people.

Summary

VITAS is composed of work samples based on 15 worker trait groups in the DOT. The work samples included are nuts, bolts, and washer assembly; pipe assembly; message taking; proofreading; payroll computation; circuit board inspection, filing; lock assembly; spot welding; and drafting. Originally designed for the disadvantaged population, VITAS may be useful in the evaluation of physically disabled and mildly retarded persons.

Process

Work samples may be given in any order, but it is recommended that the order of presentation progress from simple to complex. All work samples may be completed in around 15 hours. The VITAS has limited use in occupational exploration.

Reports

The scoring and report forms are similar to those used [illegible] the JEVS and VIEWS.

Use with Visually Impaired Individuals

VITAS is basically a revision of the JEVS system. Consequently, comments applicable to JEVS are equally applicable to VITAS. There is no research literature detailing its use with visually impaired persons, nor did any facility or school surveyed report using the VITAS in the vocational evaluation of visually impaired clients/students.

Cost

$8,190.00 includes work samples, manuals, forms, shipping, and tuition for training in Philadelphia, and one on-site visit. Training is required, and travel expenses must be paid by the purchaser.

WIDE RANGE EMPLOYABILITY SAMPLE TEST (WREST)

Jastak Associates, Inc.
1526 Gilpin
Wilmington, Delaware 19806

Target Group: Severely mentally handicapped individuals

Summary

WREST consists of work samples that are brief, low-level tasks designed primarily to assess manipulation and dexterity abilities. The WREST seems most useful for assigning clients to suitable jobs in sheltered workshops. The work samples include tasks of folding, stapling, packaging, stringing, gluing, collating, color matching, pattern matching, and assembling.

Process

WREST requires about one and one-half hours to complete and may be administered in any order for small groups of three to five persons. Each test contains a practice period prior to the timed assessment phase.

Reports

A single two-page form is used to record all behavioral observations, work history, and recommendations.

Use with Visually Impaired Individuals

While no rehabilitation facility or school reported using the

WREST, it may be used with multihandicapped blind students or clients, with modifications. Individual administrations of the WREST would appear to be preferable when an evaluator works with a multihandicapped blind individual.

Cost

Approximately $1,830.00.

NEEDS AND RECOMMENDATIONS

In the last 25 years vocational evaluation has emerged as a powerful tool for determining the vocational or career strengths and needs of handicapped people. Unlike more traditional assessment techniques, vocational evaluation uses work, real or simulated, as a focal point of vocational assessment and exploration (VEWAA, 1975). While vocational evaluation has been used for a number of years to assess the vocational potential of visually impaired persons, few vocational evaluation techniques were dedicated solely to meet the unique needs of this population until recently. Bauman (1975) described how work samples might be used in the vocational evaluation of persons with visual disabilities. The Materials Development Center, University of Wisconsin-Stout, published guidelines for the modification of locally and commercially developed work samples (Dicksen, 1976). A series of work samples designed to measure the manual dexterity skills of visually impaired persons was developed by Clawson (1968). Two major commercially developed work sample systems, VALPAR and McCarron-Dial, contain modifications for evaluating persons with visual impairments. Cotten (1979) described an eclectic model of vocational evaluation of visually impaired persons. Richterman (1982) described work sample technologies developed by Aarons and associates to measure the work abilities of visually impaired persons. This work emphasized the vocational assessment of the multihandicapped visually impaired population for whom careers in protected employment settings is the most probable vocational goal.

Despite all of these important contributions, there are still gaps in the kinds of vocational evaluation services available to both education and rehabilitation personnel working with the visually impaired population. Among these gaps are the limited range of jobs for which samples have been developed, a lack of attention to the learning styles and needs of visually impaired individuals in the development and the use of work samples, a lack of work samples which focus on job training programs in which visually impaired persons might enroll, inadequate analyses of the visual demands of jobs and potential job modifications, and the need for reliability and validity studies of existing work samples employed in vocational evaluation. Given the increasing number of visually impaired persons with multiple disabilities, it is important that additional work samples be developed to meet the needs of the vocational evaluator serving this population. Work samples for blind and visually impaired persons also need to be developed for the skilled and technical careers which are being generated by changes in the U.S. economy.

A great deal of current work in the field has centered on the development of locally based work samples which focus on immediate job placement as the objective of the vocational evaluation process (Materials Development Center, 1980). These work samples have targeted jobs traditionally held by visually impaired persons in the service, clerical, and industrial occupational fields. Because career opportunities for the visually impaired person can be expanded through vocational training and education and because more and more visually impaired persons are participating in vocational, technical, and professional education programs, there is a need for vocational evaluation services to focus less on current skill levels and more on how, what, and where visually impaired persons can learn to perform the tasks required to successfully complete these training programs (Weisgerber et al., 1980).

Figure 21 presents an analysis of work samples which have been modified to accommodate the visually impaired individual. The work samples are categorized by Roe's work-field-level of job definitions (1956). Using this approach, it is clear that the vast majority of task-oriented work samples used with visually impaired persons are clustered in the business/organization and technology fields and at the semi-skilled and unskilled levels. Two other systems, COATS and Project Discovery, contain work samples in a wide range of fields and at higher levels of job complexity than those contained in the figure. In a survey of rehabilitation facilities and schools which served visually impaired persons, however, neither of the two work samples systems were used by vocational evaluators in these facilities.

VALPAR's CUBE and the electromechanical work samples developed by the National Industries for the Blind are two of the trait-oriented work samples which have been designed to accomodate visually impaired clients. As with all trait oriented work samples, the work sample user should note that possession of a trait by an evaluee does not necessarily mean that he or she can perform a particular job task in which that trait is required.

Striking discrepancies are shown when kinds of jobs performed by visually impaired people are compared with work samples available to assess visually impaired people. In Chapter 1, visually impaired people were shown as represented at all levels, including many skilled, technical, and professional, with the exception of "Outdoors." Few work samples for these kinds of jobs were found or reported to be in use at schools or rehabilitation facilities. Chapter 1 also listed jobs for the business organizations and technology fields at the semi-skilled and unskilled levels. As indicated in Figure 21, there are a significant number of work samples for these jobs. The need, therefore, exists for the development of work samples for jobs in service, business contact, outdoors, science, general culture, and arts and entertainment fields at all levels, and in the business organization and technology fields at the skilled, technical and professional levels.

A likely beginning for meeting this need focuses on those skilled, technical, and professional jobs for which specialized training is available to visually impaired individuals. The work samples might include such jobs as taxpayer service representative, medical transcriber, PBX operator, occupational therapy and physical therapy aide, X-ray technician, and photo technician. Another approach would be development of work samples for jobs which are currently performed by visually impaired persons. One difficulty with both of these approaches is that they risk further stereotyping of the kinds of jobs or careers which may be successfully performed by visually impaired persons. Additional work is also needed to use work samples to assess learning

Figure 21. Modified work samples categorized by work-field-level.

	SERVICE	BUSINESS CONTACT	BUSINESS ORGANIZATION	TECHNOLOGY	OUTDOOR	SCIENCE	GENERAL CULTURAL	ARTS AND ENTERTAINMENT
I								
II								
III	SINGER		VALPAR TOWER SINGER	JEVS TOWER SINGER VALPAR Micro-TOWER				
IV	SINGER	JEVS	Switchboard WS Dispatcher WS Transcriber WS JEVS SINGER Micro-TOWER TOWER VALPAR	NIB work samples Local work sample Clawson SINGER VALPAR JEVS TOWER Micro-TOWER		TOWER SINGER		TOWER
V		JEVS	JEVS Micro-TOWER TOWER	NIB work samples Local work sample Clawson VALPAR JEVS SINGER Micro-TOWER				

(Roe, 1956, p. 151.)

styles and to help recommend both job and training modifications. This work is particularly crucial in vocational training where instructors may need to modify teaching techniques and methods of doing tasks to accomodate visually impaired students.

In conclusion, visually impaired persons have demonstrated abilities to be employed in a wide range of jobs. Many visually impaired people, however, are underemployed. Work samples, when used as a part of a comprehensive vocational evaluation process, can aid the career development of visually impaired persons by helping them explore and determine how their abilities compare with the demands of a wide range of occupations. Work samples are particularly needed for skilled, technical, and professional jobs. These work samples should involve the actual tasks and materials of the job, allow systematic assessment of the visually impaired persons's learning style, and contain information on modifications for job and training programs. It is hoped that this manual will facilitate more effective use of work samples with visually impaired persons in a way that will facilitate their career development.

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APPENDIX A

ADDITIONAL SOURCE MATERIAL

Job Analysis

Manufacturer's Guides:

Each state publishes an annual manufacturer's guide which lists all of the manufacturers of that state. Each entry is cross referenced to the SIC's manufacturer's section. Readers are encouraged to consult with their state's Department of Labor for a complete listing of all labor market information.

Materials Development Center:

U.S. Department of Labor. *The dictionary of occupational titles* (4th ed.) Washington, D.C.: Government Printing Office, 1977. (Reprinted by the Materials Development Center, Stout Vocational Rehabilitation Institute, Unversity of Wisconsin-Stout, Menomonie, WI.)

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Training Programs

Dahl, P. R., Appleby, J. A., & Lipe, D. *Mainstreaming guidebook for vocational educators: Teaching the handicapped.* Salt Lake City, UT: Olympus Publishing Co., 1978.

National Center for Research in Vocational Education:

(Information on entry-level training requirements can be obtained from the Center, Ohio State University, 1960 Kenny Road, OH 43210.)

Rehabilitation Research and Training Center (RT-9):

Job development and enhanced productivity for severely disabled persons. Washington, D.C.: George Washington University, n.d.

Work Samples

Work Sample Manual Clearinghouse:

This clearinghouse provides loan of work sample manuals that have been developed by practitioners around the country. More than 100 manuals are available and may be ordered from a catalog that is available free of charge. Loan cost is $2.00 per manual (summer, 1982); materials are not copyrighted and may be reproduced. Work samples are categorized according to the *DOT* occupational group arrangement.

This resource provides practitioners with an invaluable source of work samples which may be constructed relatively cheaply and adapted as needed for use with visually disabled persons. The Materials Development Center and the Rehabilitation Research and Training Center the University of Wisconsin-Stout have numerous publications concerning work samples.

(Materials Development Center, University of Wisconsin-Stout, Menomonie, WI 54751)

Rehabilitation Research and Training Center in Blindness and Low Vision (Rt-30):

The Rehabilitation Research and Training Center has several projects related to vocational evaluation of the visually impaired. Working together, the Center and the National Industries for the Blind have developed manuals for several electromechanical work samples. A job modification procedure is being refined to help determine optimal color and light intensity combinations for partially sighted people. Another project will modify or develop work samples to be used to assess visually impaired persons for entrance into skilled, technical, and/or professional jobs.

(Mississippi State University, Mississippi State, MS 39762)

Research and Curriculum Unit:

The Research and Curriculum Unit, College of Education, Mississippi State, developed the Vocational Education Readiness Test (VERT). VERT is actually a series of seven work samples and associated materials that were designed to assess secondary students for entrance into high school vocational education classes. The seven work samples are available in separate manuals and include welding, food service, sewing, plumbing, electrical wiring, auto mechanics, and carpentry. Each manual includes a work sample that primarily assesses motor skills and use of tools associated with the training area, a list of relevant vocabulary words, related numerical problems, and pictures that can be used for tool identification. The Research and Training Center, Mississippi State University, is in the process of adapting some for use with visually impaired students.

(Research and Curriculum Unit, College of Education, Mississippi State University, Mississippi State, MS 39762)

St. Paul Vocational Technical Center

This vocational evaluator center has developed and published work samples related to training in area vocational schools for use with the deaf. It provides a valuable resource for possible modification for use with blind or deaf/blind students.

(St. Paul, MN)

Assessment Center Literature:

Business and industries have been increasingly using work samples--they call them "job simulations"--for assessment of managerial and professional personnel. This literature provides a valuable resource for modification of work samples for use by visually impaired persons. An interesting publication is Yager's Is There Life After Assessment? (1981).